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A Human Ecological Consideration of Natural Dyes and Dyeing in San Juan La Laguna, Guatemala

by

Caroline Elizabeth Davis

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of Master of Arts

in

Textiles and Clothing

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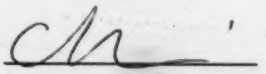

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Abstract

This thesis examines the use of natural dyes by the Artesania Peréz in San Juan La Laguna, Guatemala. It focuses on dye knowledge, relations of dyeing and the process of producing natural dyes. The *artesania* produces nineteen dyes from trees and plants. In the absence of land, the *artesania* relies on a variety of relationships to procure dyestuffs. These relations reflect the structure of relationships in the larger social world and have enabled the *artesania* to continue natural dyeing in spite of the socio-economic pressures on resources. The pressures on natural dyestuffs are the same ones compelling the *artesania* to protect and use natural dye resources. Natural dyers and dye harvesters believe that their activities are not harmful to the physical environment but their present efforts may not be enough to ensure the survival of dye plants and trees and natural dye knowledge.

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Chapter One: Introduction

In San Juan La Laguna[1], Guatemala (see Figure 1), the Artesania Peréz, an indigenous women's weaving project, produces natural dyes. This thesis documents the natural dyes produced by the *artesania*[2], their relations with the physical environment that yield, and result from, the production of natural dyes and the social relations of natural dye production. This research is important because Guatemalan weavers are being encouraged to use natural dyes as a way of improving their lives (Reiche, 1999). Natural dyes are perceived as harmless to the physical environment and dye producers (Aid to Artisans, 1997; Reiche, 1999), and more accessible to weavers, than costly synthetic dyes, thus giving weavers greater control over raw materials.

The present research reveals the precariousness of the *artesania*'s natural dyeing activities. Extensive knowledge and specialized skills are required by the natural dyers and harvesters to protect their natural dye sources. The pressures that compel the *artesania* to use, and protect, natural dye plants and trees are, paradoxically, at the root of the degradation of the physical environment in Guatemala (see Wearne, 1994). This case study of natural dyes used in San Juan La Laguna represents a remarkable situation. Through the use of available resources, namely knowledge, plants and social relationships, a landless group of indigenous women have managed to fill the demand for green craft products.

This thesis documents the vulnerability of natural dyeing and the struggles of the Artesania Peréz to continue this practice. This document offers insight into the use of

---

[1] Henceforth, I may refer to San Juan La Laguna as San Juan.

[2] The direct translation of this Spanish term is 'handicrafts' but as it is used by group members it is more appropriately translated as 'craft project'. It is neither a weaving co-operative nor a small business, as defined by board members of the Artesania Peréz, although it combines characteristics of both (see Chapter Seven for further discussion). I use *artesania* throughout this document in the absence of an appropriate English term.

Figure 1 Map of Guatemala

natural dyes that should be valuable to organizations encouraging weavers to take up this practice. Development programmes that encourage the (re)adoption of natural dyes must include indigenous participants from the planning stage onward and fit the specific circumstances of the intended group if the intervention is to improve their lives.

This thesis is a product of the five months that I spent in San Juan La Laguna, Guatemala, with the Artesania Peréz. Prior to my fieldwork in Guatemala, I met two members of the Artesania Peréz who were involved in an educational tour of Western Canada. I was able to meet with the women on three separate occasions to discuss the possibility of my conducting research with their *artesania*. During my last meeting with the women I decided, with their encouragement, to travel to San Juan to investigate their use of natural dyes in textile production. The background of the *artesania*, presented in Chapter Two, describes the founding of the group, as a reaction to the pressures of life in their village.

The practical activities, in which I engaged in order to complete the research goals (described below), are discussed in Chapter Four. The centrality of gender to different learning interactions is illustrated through the discussion of different methods of data collection. Women and men in San Juan La Laguna transmit natural dye knowledge in different ways. In order for me to gain access to natural dye knowledge, I had to be in a position that was appropriate to the social world of San Juan. The position that I occupied in San Juan, according to my own perceptions, was not self-determined but the result of various interactions with research participants throughout the duration of the fieldwork period.

Conducting research into natural dye use by the *artesania* presented me with a unique opportunity. Many authors note that the use of natural dyes is uncommon in

Guatemala and occurs only in isolated instances (Anderson, 1978; Carlsen & Wenger, 1991; Schevill, 1991). Not only was I able to experience this 'uncommon' activity, my research represents the first conducted specifically on natural dyes used in San Juan La Laguna. The inventory of natural dyes used by the *artesania*, a product of this research, is presented in Chapter Five. The comparison of my inventory with others from the published literature emphasizes the importance of recording the use and origin sites of natural dyes.

The socio-economic pressures on the inhabitants of San Juan and neighbouring communities are illustrated in the discussion of the issue of land ownership, presented in Chapter Six. As land is accumulating in the hands of a few, those Guatemalans with few options for survival are forced to apply increasing pressure on available resources (Wearne, 1994). However, these pressures have not developed into overexploitation of natural dyestuffs on the part of the men employed by the *artesania* to harvest dyes. The discussion of the sustainability of natural dye harvesting illustrates the need to consider social circumstances surrounding the use of natural dyeing along with the condition of the physical environment.

The deforestation and intensification of the cultivation of land surrounding San Juan La Laguna results in a difficult position for the Artesania Peréz. There are few natural dye trees or plants close to the village and the *artesania* does not own land on which to grow natural dyestuffs. In the place of natural capital, the *artesania* relies on a variety of relationships to procure natural dyes. The description of these relationships, and others related to natural dyeing, is illustrative of the manner in which the organization of the *artesania* is patterned on the household, the basic unit of social organization in Guatemala (Hill and Monaghan, 1987; Nash, 1970). A description of the transmission pathways of

natural dye knowledge, presented in Chapter Seven, creates a more comprehensive understanding of the perceived value of natural dyes and knowledge of the natural dye processes to the *artesania*.

My investigations into the use of natural dyes by the Artesania Peréz were based on specific research questions described below.

Specific Research Goals

The overall objective of the research was to explore the production and use of natural dyes by the *artesania* within a holistic framework that focussed on the social and physical environments. To conduct these investigations, I developed the following research questions: how does the *artesania*'s use of the dyes affect their social and physical environments and how do these environments affect natural dye usage? For purposes of clarity the presentation of my research findings has been broken down into three major components: natural dyes, the physical environment and the social environment.

The first goal of the research was to determine what natural dyes are being used by the *artesania* and how they are produced. The lack of published literature on natural dyes made a compilation of dyestuffs necessary; this provided a starting point for investigations into the physical and social environments. The research was not intended to be simply a record of natural dyes and recipes used by the Artesania Peréz. A result of this research is the documentation of indigenous knowledge about natural dyes.

The second research goal was to investigate the relationships between the *artesania* dyers and their physical environment. This involved participating in all aspects of natural dye harvesting, collection, production and use and the determination of the sustainability of

these practices, i.e., an exploration of indigenous dye knowledge relative to the physical environment. The most important questions for this aspect of the research include: how does the state of the environment affect natural dye use and how does the use of natural dyes influence the state of the physical environment? The research supports the claim that these influences need to be determined as specific to location and group (see Godoy, Lubowski and Markandya, 1993).

An exploration of the role of natural dye knowledge and dyeing processes as a strategy to deal with present social circumstances (International Research Development Centre [IDRC], 1992) was the third goal of the research. Investigating the social impacts of natural dye usage is essential to understanding the role of women in the community and gender relations. The social and political marginalization of women in Central and South America has restricted their voices to certain areas, including that of textile production (Ehlers, 1990). The components, specifically dyes in the case of this research, can be studied to gain understanding of social interaction (Hodder, 1984) including gender relations and the position of natural dyers in the *artesania*.

The fourth research goal is to analyze the interaction between the social and physical environments to gain insight into the reciprocity of influence that they have on each other and on natural dye use. This research illustrates that indigenous knowledge plays a central role in the interaction between environments. An interdisciplinary approach, described in Chapter Three, enabled the exploration of various aspects of indigenous knowledge including the composition and transmission pathways. This approach has also been used to facilitate connections of specific concepts from anthropology, botany, economics, history, natural resource management and sociology to provide a holistic consideration of the use of

natural dyes on a small-scale within the environmental contexts in which this practice occurs.

Justification of the Research

The lack of research on natural dyes is acknowledged in the following statement from the International Expert Council on Non-Wood Forest Products (1995):

> "It is paradoxical that, in spite of their real and potential value, most NWFPs[3] (non-wood forest products) remain grouped as *minor* products of forests. These products rarely feature in statistics and are hardly studied or researched... Most NWFPs are often associated with traditional uses that are not widely known and/or are linked to the problem of poverty and subsistence" (p. 1).

The marginalization of NWFPs as a group is paralleled by the marginalization of natural dyeing as a part of textile construction and, more broadly, craft production. An example of this marginalization is found in Carlsen and Wenger's (1991) article on natural dyes in Guatemala: "While human existence in most climates, including that of Guatemala, necessitates the use of clothing, there is nothing that requires clothing to be coloured" (p. 374). This sentiment, based on a narrowly utilitarian perspective that dyes are superfluous, ignores the needs that the use of natural dyes may fill, such as socio-cultural and spiritual requirements (Pancake, 1991). The research presented in this thesis illustrates: (1) the need for natural dye research, (2) the necessity of approaching this research in a holistic manner that acknowledges the influences of this practice on the different environments and (3) the influences of various environments on natural dyeing.

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[3] Natural dyes are grouped as NWFPs but rarely mentioned in this document.

The Healthy Dyes Project (HDP) centred in the Department of Human Ecology at the University of Alberta emphasizes the need for natural dye research to the end of improving the lives of people. The aim of the HDP (1999) "is: to collaborate with weavers and weaver/community organizations which are involved in textile issues in their daily lives and to orient dye research and development projects to enhancing the health of weavers and their communities and environments" (p. 1). As non-governmental organizations (NGOs), fair trade organizations (FTOs) and international development agencies (see Reiche, 1999) are supporting the readoption of natural dyes by weaving groups, these organizations also need to develop policy. The present research responds to the need for more information about the consequences of the use of natural dyes.

Finally, as noted above, this research represents the first inquiry into natural dyes used in San Juan La Laguna, Guatemala. Furthermore, the inventory of natural dyes presented in this thesis contributes to a more comprehensive list of dyestuffs grown and used in Guatemala.

Chapter Two A Brief History of the Tzutujil, San Juan La Laguna and the Artesania Peréz

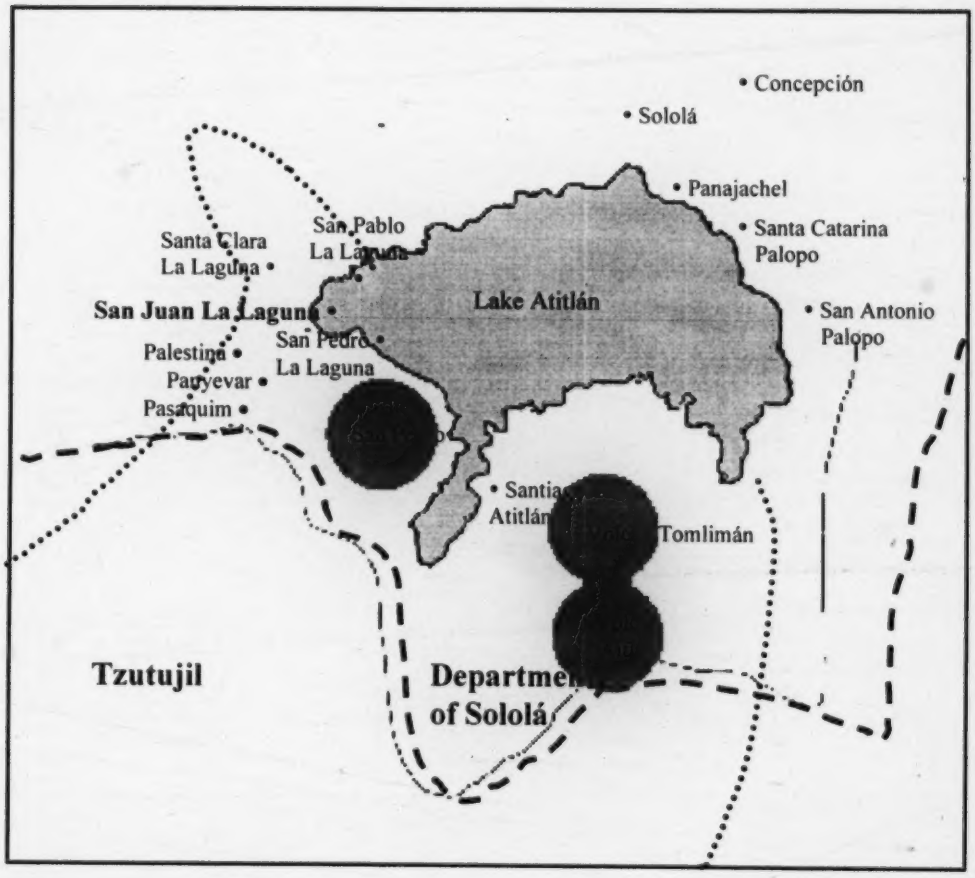
Introduction

The purpose of this chapter is to provide the background for my investigations into natural dye use by the *artesania*. This chapter is divided into three sections. The first section presents a brief socio-political history of the Tzutujil and Guatemala. This history is followed by a discussion of the founding of the Artesania Peréz. The final section of this chapter is a description of the village of San Juan and current commercial activities.

People of the Bird House

San Juan is located in the Tzutujil language/cultural area on the Western shore of Lake Atitlán in the Department of Sololá (see Figure 2). The indigenous Tzutujil, although a minority in the socio-economic and political realms of Guatemalan society (Davis, 1988; Perera, 1993), make up ninety-seven percent of the population of the municipality of San Juan La Laguna (Organizacion Internacional Para las Migracions Mision en Guatemala [OIM], 1997). Based on archaeological sources, the Tzutujil were once part of a powerful people living in the Tabasco-Veracruz area who were defeated when war broke out and driven from the Toltec capital of Tula (Chichén Itza) (Carmack, 1981; Orellana, 1984). They arrived at Tulan where war once again broke out forcing the Quiché to migrate to the highlands of Guatemala circa 1225 (Carmack). The Tzutujil probably arrived in the highlands about the same time in the thirteenth century (Orellana).

Figure 2 Map of Lake Atitlán Area
(After Mendoza and Mendoza, 1989, p. 703)



The account of the Tzutujil migration recorded in the Popul Vuh, the Book of Council of the Quiché Mayan Lords (Tedlock, 1996), is similar to the reconstruction of these activities based on archaeological evidence. The people of the Bird House (Tzutujil) arrived at Tulan (Tedlock). There they received their gods

> and there they broke apart. There are those who went eastward...They were poor...But they were people of genius in their very being when they came away from Tulan Zuyua, Seven Caves, Seven Canyons (Tedlock, p. 152).

The location of the Tzutujil between the Quichés and the Cakchiqueles made for an uneasy existence. "*Hasta mediados de siglo XV (entre 1425-1475) los quichés y cakchiqueles formaron una sola organización politica y social... El pueblo tzutuhil, por su parte, se vio obligado a pelear continuamente con los dos pueblos citados, quienes se alternaron en el control sobre dicho grupo minoritario*" [Since the middle of the fifteenth century (from 1425-1475) the Quichés and the Cakchiqueles formed a sole political and social organization.... The Tzutujil village for its part, was forced to fight continuously with both of the towns mentioned, who alternated control over this minority group] (OIM, 1997, p. 1). The combatants and the nature of the fighting in the area of Lake Atitlán changed in the early part of the sixteenth century with the arrival of the Spanish.

"E*n abril de 1524, depués de la destrucción de Gumarcaah (Utatlán), Pedro de Alvarado fue recibido como amigo por los gobernantes de Iximché, quienes le pidieron ayuda en la guerra que libraban con los tzutuhiles. Alvarado atacó la capital tzutuhil, Tziquinahá o Atziquinahá (hoy Santiago Atitlán) la que fue tomada el 20 de Abril de 1524*" [In April of 1524, after the destruction of Utatlán, Pedro de Alvarado was received like a friend by the governors of Iximché, who asked for help in the war that they waged with the

Tzutujil. Alvarado attacked the Tzutujil capital, Tziquinahá or Atziquinahá (today Santiago Atitlán) and it fell the twentieth of April, 1524] (OIM, 1997, p. 3). The Spanish rulers organized Mayan society to ensure the dominance that enabled them to treat the indigenous population of Guatemala as a minority. It was under Spanish rule that the village of San Juan La Laguna was founded and given a 'proper'[4] name, sometime between 1618 and 1623 (OIM; Orellana, 1984). Guatemalan independence was achieved from Spain in September of 1821.

The circumstances following the formation of the Republic of Guatemala in 1821 are best described as a political melee. The Guatemalan national government has been presided over by dictators, revolutionaries and military men. In the early twentieth century the original role of the Guatemalan military, "defence against foreign aggression" (Black, Jamail and Chinchilla, 1984, p. 21), was discarded in favour of "prop[ping] up conservative forces and maintain[ing] a type of political stability that would prevent reform minded parties from achieving political power" (Handy, 1984, p. 150). The goal of political stability was abandoned to ensure that only acceptable, or what was perceived as acceptable by controlling interests, political parties participated in elections (Handy, 1984). The 1960s saw an increase in the military's power culminating in *La Violencia*[5] in which over 150,0000 were killed, 40,000 disappeared (Doyle, 1999), millions were displaced[6] and entire towns destroyed (see Carmack, 1988).

---

[4] The original name of San Juan La Laguna is unknown but there is archaeological evidence of Prehispanic occupation to the east of present day San Juan (Orellana, 1984).

[5] The Violence. This term is commonly used in Guatemala instead of the term civil war (see also Zür, 1994).

[6] Specific numbers are difficult to determine. Zür (1994) notes that people fear reprisals for admitting that members of their families disappeared and the dead are still being discovered and disinterred from mass graves at the time of this writing.

Founding of the Artesania Peréz

The *artesania* was founded by four Juaneras[7] in 1980, the same year a guerilla group called the Organization of People in Arms (ORPA) came to Lake Atitlán (Carlsen, 1997). Counter-revolutionary measures taken by the Guatemalan government was "total war at the grassroots" (Jonas in Carlsen). "Following guerilla activity in a particular area, violence rained on the local Mayan population" (Carlsen, p. 144).

> Women cannot leave their villages to go to another village in order to earn a little extra unless they have permission to do so. If they express a desire to leave, they are suspected of working to supply the guerillas. It is impossible to earn enough in one's village because everyone is so poor and to have more than necessary is seen as storing for guerillas (Anderson and Garlock, 1988, p. 42).

The creation of work within the boundaries of the village of San Juan La Laguna gave the women a measure of security against the circumstances created by the civil war.

Although the women respected the invisible boundaries between the village and the 'war zone', the army did not. The president of the *artesania* told me the story of "the day that the military knocked on [her] door". The military personnel said that she "had been observed in the mountains and therefore she must either be helping the guerillas or be a guerilla herself". She told me that she had been collecting dyes at the time and was not involved in any guerilla activity. She was taken away and detained. She said that only with the help of God and two North Americans[8] she was able to escape before she was killed and return to her home.

---

[7] Juaneras refers to a group of female inhabitants of San Juan La Laguna. Juaneros is the masculine plural of the term and refers to a group of males or males and females.

[8] I use this designation in order to protect their anonymity. I was unable to talk to either of these people as shortly after this incident they left Guatemala and according to members of my household did not return to Guatemala.

The circumstances surrounding the civil war left many widows with few opportunities for ensuring the survival of their families. The *artesania* president attributes the increasing membership of the *artesania* to the economic returns that it provides for women. The membership tripled from the original four to twelve in 1983 almost tripling again by 1990 with thirty members. The president estimated that there were forty-five women currently in the *artesania* including the twenty-three women in San Juan La Laguna whom I interviewed. The other twenty-two women live in the countryside of Concepción[9] (see Figure 2).

The foundation of the Artesania Peréz was accompanied by a return to natural dyes in textile production. The *artesania*'s return to natural dyes was based, partially, on attempting to capture a market niche by using materials that would differentiate them from surrounding communities (Sombrilla, 1996). In conjunction with an economic motivation, the inhabitants of the community were concerned that traditional dyeing knowledge was gradually disappearing (Olson, 1999). Natural dyes are a strategy used by these women to fulfill their needs based on their current circumstances.

San Juan La Laguna

The population of the municipality of San Juan, which includes the village proper, the *aldeas*[10] of Palestina, Panyevar and Pasaquim and rural inhabitants, is 6,149 (OIM, 1997). The services in the village include one post office, two telephones, four Catholic

[9] I did not interview any of these women as I was unable to negotiate accompaniment, with any member of the *artesania* that I asked, for myself. The reasons my request for accompaniment to visit Concepción was denied include: "it is too far to walk. It would take all day and the path is difficult" and "it is dangerous. There are robbers".

[10] Satellite villages.

churches (one each in the village and the three *aldeas*), at least four Evangelical chapels, five pre-primary schools, five primary schools and two schools for basic literacy. Seventy percent of the population of San Juan La Laguna has access to electricity and eighty-six percent to potable water (OIM) that is piped in from the nearby mountains.

The major commercial activities listed in the "*Diagnostico del Municipio de San Juan La Laguna, Departamento de Sololá, Guatemala, Centro America*" [Diagnostics of the Municipality of San Juan La Laguna, Department of Sololá, Guatemala, Central America] (OIM, 1997) are agriculture, artesanry and industry. Agricultural activities involve the cultivation of corn, beans, onions, cabbage, tomatoes, mangoes, bananas, guayaba, coffee and onions. The latter two are destined for external markets while the rest are grown for local consumption (OIM). The artesanal sector includes two weaving groups, nine tailors, eight carpenters, one ironworker and one painter. Three coffee processing mills are the only industries located in San Juan La Laguna (OIM). Commercial ventures in the village include thirty-five general stores (OIM), one restaurant, two butchers, two pharmacies, one mechanic, seven corn grinders and several transportation (boat and bus) ventures.

Economic opportunities for Juaneros are poor within the context of their subsistence economy. The majority of the people work as agricultural labourers. Some take part in migration to coastal or other areas. All Juaneras, including the majority of the members of the *artesania*, take part in harvesting coffee from January to March. In 1991, eighty-nine percent of Guatemalans lived below the level of poverty , described by Wearne (1994) as the inability to meet basic material needs, and sixty-seven percent lived in extreme poverty[11].

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11 OIM (1997) defined the level of poverty as earnings below 1200 Quetzals (Q) a year, approximately 240 Canadian dollars based on current rates of exchange. A certified teacher, considered a lucrative position by Juaneros, makes at the most 1000Q a month.

Landlessness may be at the root of this poverty as approximately two percent of the population owns seventy-one percent of the land (Perera, 1993). During the civil war, the army, through confiscation or destruction, left at least 420, 000 peasants without land (Perera) adding to the loss of land through demographic pressures and inheritance patterns in Guatemala (Barrios, 1997).

The people of San Juan La Laguna are landless. At the turn of the century a drought threatened the village so they borrowed money from a neighbouring town with their land as collateral (Olson, 1994; Seminario de Integracion Social Guatemalteca, 1968). Unable to make enough money to pay back the loan they are now renters on their ancestral lands (Olson, 1994; Seminario de Integracion Social Guatemalteca). The landlessness and poverty of the current inhabitants of San Juan La Laguna are prominent themes of local folktales. *La Historia de San Juan La Laguna* [The History of San Juan La Laguna], told to me by an *artesania* member in her seventies, is the story of a wealthy man who came to the village. He was dressed in the clothing of a *malincha*[12] and carried bags of money. He had not been born in town and was unknown to the locals: "he may have been a god of those before". The people threw rocks, and hit him with sticks and other things chasing the man out of town with his money. This is why, the storyteller said, Juaneros are poor. The histories are similar; the riches of San Juan La Laguna fled to other parts of the country through no fault of the present inhabitants.

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[12] A traitor. *La Malincha* was the Atzec mistress and translator for Cortez who, according to legend, played a role in orchestrating the Aztec conquest (Fernandez, 1993). Based on the storyteller's description of the man she was probably referring to a *mariachi*, a Mexican folk musician.

Discussion

This chapter highlights the themes of the poverty, political instability and socio-political marginalization of Juaneros. These themes figure prominently in the foundation of the Artesania Peréz and their motivations to return to natural dye use. Potential opportunities for survival are limited while the economic pressures are limitless. The *artesania* was founded to provide an opportunity for Juaneras to contribute monetarily to the survival of their families. The return to natural dyes, as discussed, was motivated by economics and the desire to maintain and perpetuate natural dye knowledge as a 'tradition' of their ancestors. The variety of reasons involved in the *artesania*'s return to natural dyes required a theoretical approach, developed in the following chapter, that reflects the complexity of the considerations surrounding the use of natural dyes for the *artesania*.

Chapter Three: Theoretical Approach

Introduction

In order to meet the goals of the research, outlined in Chapter One, I chose to employ a human ecological approach. The goal of this chapter is to present the human ecological framework that was used for the investigation into natural dye production and use by the Artesania Peréz. This approach best suits the complexity of the research goals and the consideration of indigenous knowledge, a central issue in this research. A summary of current conceptualizations of indigenous knowledge in the published literature will establish the background for the definition of indigenous knowledge used in this research.

To illustrate the theoretical approach to this research, I will first describe interactive approaches to development and human ecological models. Key characteristics of this literature are interdisciplinarity and interactivity, allowing for a holistic analysis of the phenomena under investigation. I confine my discussion of development literature to two approaches, as the most appropriate for this research from the many approaches available. One of these approaches is developed by the International Development Research Centre (IDRC, 1992). The Leiden Ethnosystems and Development Programme produced the other approach (Slikkerveer and Dechering, 1995). Generally, human ecological literature deals with interaction between humans and their environments (Steiner, 1995; Wang and Ye, 1991; Westney, Brabble and Edwards, 1988). The final section of this chapter discusses the major tenets of the theoretical strategy, a human ecological approach, which I used throughout this research.

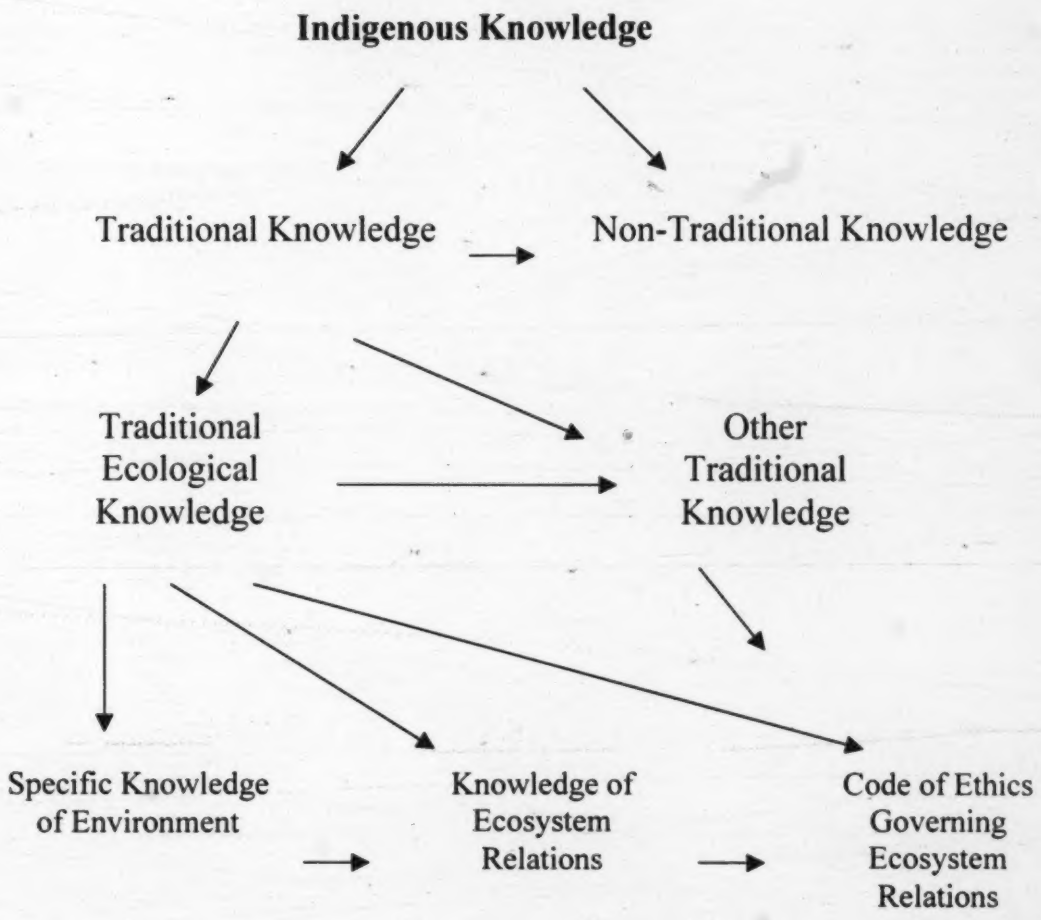
Indigenous Knowledge

Products of plants are not found in nature, as such, but are the results of human knowledge (Elisabetsky, 1991). Indigenous knowledge is a term that has gained widespread use in the past decade (Purcell, 1998). However, the meaning of the term is not fixed and depends on the author. Purcell defines indigenous knowledge as "a body of historically constituted (emic) knowledge instrumental in the long-term adaptation to the biophysical environment... that which is directly functional in long-term survival" (p. 260). This definition is limited because it does not include any other environments to which people may have to adapt. For example, the social, economic (Fernández, 1994), or cultural environments, which are all not necessarily non-functional.

Stevenson (1996) views indigenous knowledge as the product of two sources: traditional knowledge, including ecological and other, and non-traditional knowledge (see Figure 3). Stevenson's concern with ecological (he uses this term as synonymous with biophysical) knowledge is apparent as he assigns social, cultural and spiritual knowledge to one grand category (which is never defined or explained) titled 'other traditional knowledge'. Agrawal (1995) criticizes the construction of dichotomies, such as those apparent in Stevenson's article, stating that they are "problematic issues as currently conceptualized" (Agrawal, p. 413). These issues concern the predominant view, as a result of the construction of dichotomies, of indigenous knowledge as being formed within a closed system, unchanging and divorced from socio-cultural and historical contexts (Agrawal).

This problematic conceptualization of indigenous knowledge may stem from a desire to place indigenous knowledge on a comparable epistemological plane with western science

Figure 3 Structure of Indigenous Knowledge Systems[13]



Note: The arrows represent the pathways of influence of specific knowledge types.

[13] From "Indigenous Knowledge in Environmental Assessment," by M. Stevenson, 1996, *Arctic*, 49(3), p.280. Reprinted with permission of the Arctic Institute of North America.

(DeWalt, 1994; Purcell, 1998; Stevenson, 1996). This equalization program often results in the view that validation of indigenous knowledge by scientific knowledge is necessary (DeWalt; Stevenson). A second result is the reduction of indigenous knowledge to a few components which interact according to a set pattern (Stevenson). This is reflected in the following statement, "If the words 'traditional Inuit knowledge' are supposed to include everything we know about everything, it looks to me as though we probably don't know too much" (Kangirsuk in Stevenson, p. 280). Finally, comparing western science, promoted as objective and value-free, with indigenous knowledge denies the social and cultural contexts of knowledge in general.

A more holistic definition of indigenous knowledge includes the understanding, practices and perceptions generated and transmitted over time within a particular or local setting that form the basis for survival (Fernández, 1994; Slikkerveer & Dechering, 1995; Stevenson, 1996). Indigenous knowledge is an "integrated system of knowledge, beliefs and perceptions" (Berkes, 1993, p. 5) based on interactions with and observation of their environments. The structure of indigenous knowledge systems illustrates the importance of holistic analysis as all environments inform knowledge (Berkes; Purcell, 1998; Stevenson; Vivian, 1995).

Interactive Development Approaches

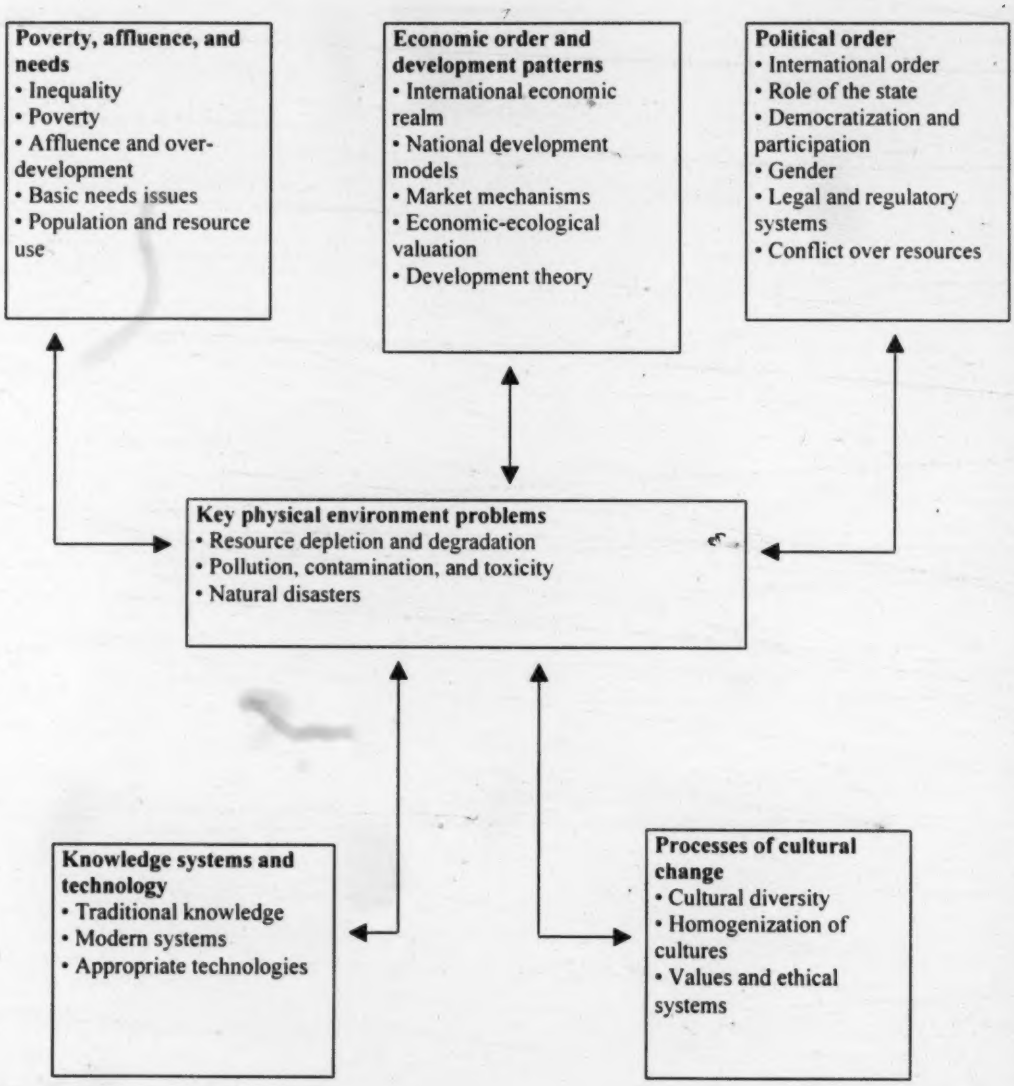
In "For Earth's Sake", IDRC (1992) outlines the links between socio-economic and environmental crises in the South and a system of global inequity. Economic development has historically neglected other spheres, broadly defined as social, which contribute to poverty and environmental degradation (IDRC). In light of this failing, IDRC constructed an

Interactive Research Agenda (Figure 4) to "contribute to holistic analyses of [the] social cause and effect" (p. 107) of environmental crises.

As illustrated in Figure 4, environmental problems are the point of departure for social research areas (IDRC, 1992). Elements of the issue areas seem comprehensive although neither the role of community or local systems of governance nor spiritual beliefs are mentioned. The central position of physical environmental problems is problematic as it acts as a filter or point of negotiation between social areas. The major fault of this approach is that there is no interaction between the areas, independent of the physical environment. Otherwise, equal importance is given to all of the environments and interaction between the environments can occur in a variety of ways.

The research framework utilized for this research project was influenced by an article describing the Leiden Ethnosystems Approach (Slikkerveer and Dechering, 1995). The major aspects of an ethnosystems approach include the assessment of community within the natural and cultural setting, the inclusion of a range of subsystems, and a dynamic assessment of the concept of culture involving interaction between Western and Non-Western knowledge systems (Slikkerveer and Dechering). "This approach links up with the *emic* view of cultures *within*, as contrasted to the *etic* view of cultures from *outside*, ... enabl(ing) a non- normative assessment of local...cultures" (Slikkerveer and Dechering, p. 437). This approach is important as it allows for the articulation of a particular socio-cultural group in a holistic way with individual perceptions, cosmologies and knowledge as the most important components (Slikkerveer and Dechering).

Figure 4 International Development Research Centre Interactive Research Framework[14]



[14] From "*For Earth's Sake*," by the International Development Research Centre, 1992, p. 107. Reprinted with permission of Canada's International Development Research Centre.

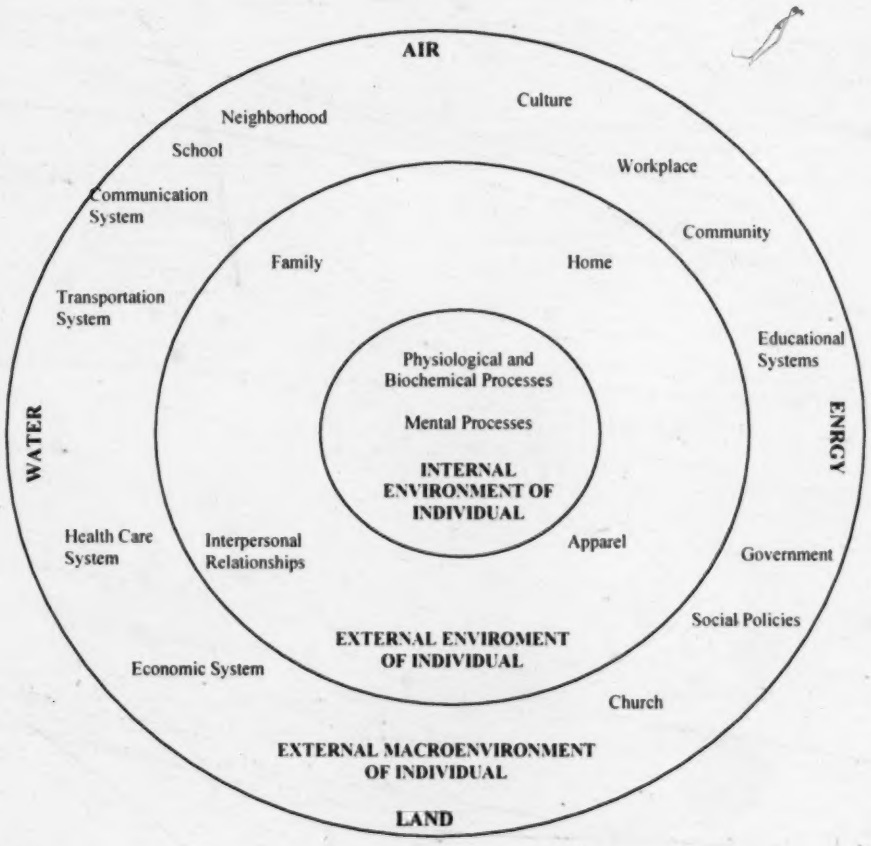
Human Ecological Concepts and Models

Human ecological theory that informed my approach can be divided in terms of the perceptions of various authors relative to their definitions of human-environmental interaction. The first body of human ecological theory, more congruent with the research approach adopted for the present study, considers interactions between humans and their whole environment. The second theoretical approach, exemplified by one article, limits the concept of the environment to the natural environment.

Westney et al. (1988) state that Human Ecology "is the scientific and holistic study of human beings, their environments and human-environmental interactions" (p. 129). The concept of holism is illustrated in their model (Figure 5) which includes the internal, external, social, cultural, economic, natural and material environments of individuals. In order to counterbalance the fragmentation of society, Steiner (1995) sets out four dimensions "via which to transcend established boundaries set by science in different ways" (p. 35). The first of the two dimensions important to this research is the Human Ecological Triangle (Figure 6) which encourages the transcendence of disciplines (Steiner). The transpersonal dimension, the Human Ecological Traffic Light (Figure 7), is "a means to open our psyche to the external and internal experience of nature and to investigate our capacity to find orientation in feelings and intuition" (Steiner, p. 43). These human ecological approaches allow for the holistic study of human-environment interactions and their results (Steiner, 1995; Visvader, 1986; Westney et al.) which is central to this research.

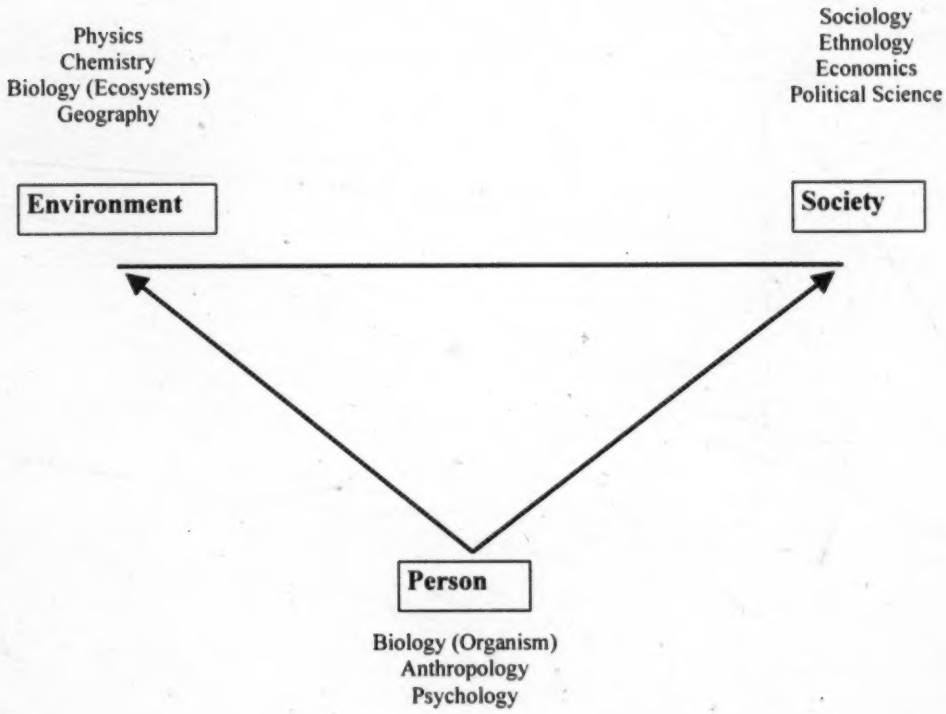
Wang and Ye (1991) illustrate important aspects of human ecological theory in the Social-Economic-Natural Complex Ecosystem (SENCE) model (see Wang and Ye, p. 193).

Figure 5 Concepts of Human Ecology Regarding the Environment of Human Beings[15]



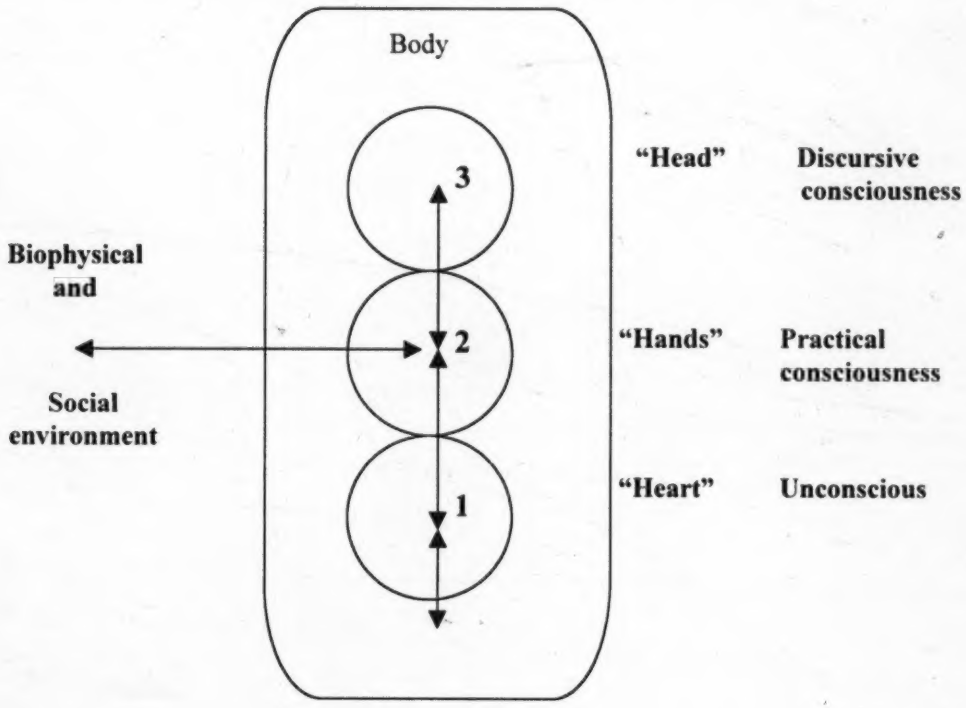
[15] From "Human Ecology: Concepts and Perspectives," by Q. Westney, E. Brabble and C. Edwards, 1988, *Human Ecology Research and Applications, Second International Conference of SHE, College Park*, p. 135.

Figure 6 Human Ecological Triangle[16]



[16] From "A Conceptual Framework for a General Human Ecology," by D. Steiner, 1995, *Human Ecology: Progress Through Interactive Perspectives*, p. 36.

Figure 7 Human Ecological Traffic Light[17]



[17] From "A Conceptual Framework for a General Human Ecology," by D. Steiner, 1995, *Human Ecology: Progress Through Interactive Perspectives*, p. 44.

"Human society may be considered as a human ecosystem which is based on the natural environment, dominated by human activities, ruled by social institutions and exchanges material, energy and information with its environment" (Wang and Ye, p. 193). Wang and Ye discuss environmental problems in 'developing' countries as the result of "inefficient use of resources, inharmonious composition of the system elements and low self-regulation" (p. 194). This article is representative of human ecological literature rooted in science that ignores critical components, such as culture, and base solutions in technology. However, the SENCE model, despite all of the faults discussed above, indicates how complex interaction takes place between different environmental components.

Discussion

As stated, indigenous knowledge is holistic in nature and based on interaction with, and observation of, surrounding environments. An investigation of this knowledge is best undertaken with a human ecological perspective because the overall goal of Human Ecology is to study human-environmental interactions. The interactive development approaches and human ecological theory described above illustrate the key concepts that form the theoretical approach to the research presented in this thesis. That approach is based on the concepts of integration of knowledge, the interconnectedness of environments, the complexity of interaction between people and their environments and the practical applicability of the research agenda. I have not applied a specific model, human ecological or other. However, I have adopted the major tenets of this approach, as defined by the published literature, as guiding principles.

A human ecological approach encourages an interdisciplinary approach to research, the first principle guiding my investigations into natural dye production and use by the Artesania Peréz. This point is critical to the research as the research goals, and the published literature incorporated into this thesis, include anthropology, botany, economics, history, resource management and sociology. Jungen (1986) describes this as "interdisciplinary openness and respect" (p. 39) as it relates to academic disciplines and the movement away from a multidisciplinary/fragmented human ecology. Figure 6 illustrates the concept of interdisciplinarity.

Relative to the issue of indigenous knowledge, it is important to expand the concept of interdisciplinarity beyond academic boundaries and to include research participants as experts. Validating indigenous knowledge with scientific and engineering knowledge, as suggested by some authors (DeWalt, 1994; Stevenson, 1996), denies socio-cultural and historical contexts (Agrawal, 1995) Instead, my research assumes that indigenous knowledge is valid in its own right. This perspective necessitates an integration of the knowledge held by research participants with the knowledge from different academic disciplines represented in the published literature relevant to this research. Reciprocal relationships involving natural dyers, the social and natural environments are assessed according to the perceptions, knowledge and practice of those dwelling within the community. This is exemplified in the Leiden Ethnosystems Approach (Slikkerveer and Dechering, 1995), described above.

"The use of the word ecology marks a conceptual trend away from isolationist studies toward analysis at more complex levels, and represents on both practical and theoretical levels the attempt to rethink the relationship between the parts and the wholes"

(Visvader, 1986, p.120). This statement by Visvader illustrates the potential complexity involved with investigating natural dye use and the constructions of indigenous knowledge. The 'parts' may be defined as the components of indigenous knowledge (see Figure 3) and the environments[18] while the broader 'wholes' are Indigenous Knowledge and the activity of natural dyeing. The interconnectedness of phenomena (Visvader, 1986) is critical to achieving a better understanding of how knowledge components influence each other and interact to form Indigenous Knowledge, and how the different environments, viz. physical and social for this research. The complementary principles of the interactivity and interconnectedness of environments are evident in Figures 3 through 7.

The applied nature of a human ecological approach is the final principle guiding this research. It is inherent in the interactive development approaches because 'development' is an intervention into people's lives (WCED, 1987). To this end the research has been heavily influenced by the Healthy Dyes Project centred in the Department of Human Ecology at the University of Alberta (see Chapter 1). The HDP is an academic research agenda with practical applications.

During this research I have not applied a specific Human Ecological model. However, I have adopted three major tenets of this approach, as defined by the published literature, as guiding principles. The first principle is that of complex interaction. Potential environmental relationships are assumed to be multiple and occurring in a variety of ways (IDRC, 1992; Wang and Ye, 1991; Westney et al., 1988). This research focuses on the physical and social environments related to natural dye use in San Juan La Laguna.

[18] In this document I use the term 'environment(s)' in a holistic manner, including the cultural, economic, individual, material, physical and social environments.

However, other environments are inherently implicated due to the principle of integration or interconnectedness (Visvader, 1986) and, although investigations of the role of these environments are not part of the research goals, it is necessary in some cases, i.e. economic circumstances of the *artesania* members, to provide details as background. Second, the research goals were guided by the principle of practical applications. The final principle is that of holism, which encompasses academic disciplines (interdisciplinarity), environments and the conceptualization of indigenous knowledge. The conceptualization of knowledge, which includes the integration of cognition, tacit knowledge and feelings (see Figure 7), and how this influenced data collection during my research will be further explored in the following chapter.

Chapter Four Fieldwork: Experiences and Methods

Introduction

In this chapter I will concentrate on the insights that I gained from engaging in the practical activities necessary to achieve my research goals. I will also describe the methods that I used to obtain information about the collection, use and production of natural dyes. This chapter illustrates how the collection of natural dye knowledge brought me into direct contact with the contexts in which these activities take place. The implications of natural dye use for the social and physical environments and the interaction of these environments, described in later chapters, only became evident through the various activities that I engaged in which are described below.

Crafting Selves

In order to conduct my research I needed to gain access to indigenous women's knowledge of natural dyes and dye processes. Access to knowledge, a crucial part of any research, is based on rapport with participants (Agar, 1996; Bernard, 1995; Fontana and Frey, 1994; Hammersley and Atkinson, 1995; Spradley, 1980). "Rapport refers to a harmonious relationship between ethnographer and informant" (Spradley, 1979, p. 78). Without rapport research cannot take place. In my research I discovered that an important aspect of rapport was based on who I was, or more accurately who I represented myself to be while in San Juan, and who I was perceived to be by the research participants. In their chapter on "Field Relations", Hammersley and Atkinson discuss the implications of self on research relationships. They separate those aspects which are subject to impression management (personal appearance) and those subject to 'ascribed characteristics' including: "gender, age, 'race' and ethnic identification" (Hammersley and Atkinson, p. 92).

Feminist scholars acknowledge that 'the self' has ramifications for research. Bell (1993) writes that "we (ethnographers) do fieldwork by establishing relationships, and by learning to see, think and be in another culture, and we do this as persons of a particular age, sexual orientation, belief, educational background, ethnic identity and class...we also do it as men and women" (p. 2). Feminist ethnographers recognize that research is "contextual and interpersonal" (Stacey, 1988, p. 22). The act of writing this narrative is an attempt to situate myself within my research, to acknowledge the context of my research activities. Throughout this chapter, I discuss how I felt research participants perceived me, how I felt these perceptions influenced my investigations and my reactions. I offer this discussion in the place of a description of the biases of the research participants, which I could never really know, and my own biases, which changed throughout the course of my investigations.

"The people you study expect certain behaviors from you and relate to you in particular ways because of their understanding of who you are" (Jackson, 1986, p. 274). These perceptions/constructions of who you are, are based partially on one's representation of self. Kondo (1990) writes of her research on the Japanese workplace that "in our efforts to understand each other, my friends, neighbors, co-workers and I asserted our own identities and attempted to force each other into comprehensible categories: to craft each other" (in Walter, 1995, p. 307). As I was trying to understand natural dye knowledge from my perspective, the women in San Juan La Laguna were trying to understand me and my research from their perspectives. I soon realized that I had underestimated the cultural relativity of these perceptions. The characteristics that defined me, in Canada, as a researcher, a student with limited economic means, and an independent woman, were perceived differently in the socio-cultural context of my research site.

In my first week in San Juan La Laguna, I attempted to describe myself to potential participants as a student researching natural dyes. The women always asked what 'research' meant, a difficult task at best as the closest Spanish word that would translate into Tzutujil was 'investigator'. The historical connections of this word to the civil war, the military and government officials was something that I wanted no part of and fumbled through an explanation of research with little progress. My use of the word research may be linked with my pre-departure readings which consisted of a number of scholars clinging "to the rational, scientistic ideal in presenting their work" (Linnekin, 1998, p.83). As a researcher I wanted to live up to what I thought these ethnographers embodied, viz. serious, agreeable and above all intellectual, individuals who did not have problems dealing with the day-to-day reality of fieldwork.

My desire to be an 'ethnographer' having these characteristics ended abruptly as the result of an incident during my second week in San Juan La Laguna. The following description of this incident is taken from an email I sent:

> I was interviewing a woman in the *artesania*- very serious and intense- neighbors and children watching at a distance. All of a sudden this chicken starts making an awful racket from inside the house and comes flying out of the window- I tried to keep my composure but it scared me and everyone started laughing. So I started laughing and the chair I was sitting on- a very tiny child's chair essentially gave way and I ended up in the mud. That pretty much did it- after asking about my health (and behind) we all ended up laughing for quite some time. The children from the house laugh when they see me and the story spread throughout the town and people are still asking if I am okay. Oh well, it was pretty funny but at the time it was a little distressing- trying to maintain my dignity.

A few days after this incident occurred, I noted in my diary that it was a positive rather than negative one as I first believed. I discarded my ideal ethnographer stance and began telling

participants that I was just a student who wanted to learn about natural dyes. It was something that the inhabitants of San Juan could relate to, as many of their children were students and, in some cases, they themselves had been.

The general belief held by women in the *artesania* and others in San Juan La Laguna that I was wealthy was difficult for me personally and potentially influenced my research. This perception was constructed before I went to Guatemala and even before I decided on San Juan La Laguna as my research site. Two of the women from the *artesania* visited Canada, as the result of the efforts of an Edmonton based NGO, Sombrilla. The women formed the opinion, which was shared with other Juaneros, that all Canadians lived in palaces, were rich, well fed, and always well treated. Their visit to Canada was a tour of middle class homes and institutions. It is possible that these perceptions may not have changed if they had visited Canadians living in grinding poverty or inner cities. Poverty is culturally relative. In Canada I may be considered poor as I live below the 'poverty level' but I will not starve, be denied medical attention or be homeless and I am able to attend University through a combination of loans, scholarships, research grants and strong family support. In Guatemala, there are no such guarantees, if one does not have the economic ability to secure medical attention, a place to live, or attend school beyond *basico*[19] then one has few options[20].

I attempted to explain my 'true' (as I perceived them) circumstances (see also Linnekin, 1998): a student who had financed her studies with student loans and was able to conduct her research through research grants from the Canadian International Development Agency and the Canadian Home Economics Association. I tried to explain that I too had

[19] Kindergarten and the first six years of primary education are funded by the Guatemalan government.
[20] There are a few NGOs that provide free medical attention or education scholarships. Habitat for Humanity provides low-income housing.

financial obligations. Circumstances changed little: even if I did not have money (I was probably not believed) then I had something just as important. I had access to wealth. This access was evident from my ability to fly to Guatemala and exist for five months without any visible means of support.

I tried to present myself basically as I am, an unmarried 27 year-old 'woman' with no children, although throughout the time I spent in San Juan La Laguna I wondered if lying would not have been more profitable in terms of my research (see Wolf, 1996). The fact that the term 'woman' is also culturally relative was made apparent when, following statements that I was 27, unmarried and had no children, women asked me 'Where is your family?' 'Why did your father or mother not accompany you?' I attempted to explain that I was independent and capable of traveling alone and it was unnecessary for a parental escort. This 'truth' was not well received and I began making use of a lesser truth namely that travel was expensive and that my parents could not leave their work.

I was an anomaly to the Juaneras as there were no women of the *artesania* that were my age and unmarried. Those without husbands were either widows with children or had been abandoned by husbands. There were two unmarried women without children that I met but they were taking care of ailing widowed fathers and were in their early twenties. Aside from my age and height, the group that I had the most in common with, from my perceptions of the Juanero social world, was young girls[21]. Had I been aware of this prior to my departure I may have decided, like Wolf (1996), to invent a husband in order to ease my access to data (see below).

Craft production is an apt analogy for the construction of self. As natural dyes may be considered a textile craft, I will use a textile analogy to illustrate how perceptions of self

[21] Black (1988) notes that "marriage is the prerequisite for full adult status" (p. 95) in Quiché Mayan Society.

may have consequences for research. Simply defined, textiles are the result of the manipulation of threads. The warp, symbolizing research participants, and the weft, symbolizing the researcher, interact to create a final product, the research. The resulting cloth may be different than what is first envisioned. As Raybeck (1996) notes on his research in Malaysia, 'things go awry'. As the cloth is woven it changes, just as research relationships grow (closer or more distant) as participants come to know each other (Briggs, 1970). Growth is limited, as there are always those aspects of self or characteristics that circumscribe the possibilities, like the development of the cloth is limited by the loom.

Learning to Carry Out Research in San Juan La Laguna

"I am tired of being treated like an unruly child and ignored when convenient. Perhaps, if I start acting like an obedient child rather than a Canadian woman interested in natural dyes I can further my research goals" (excerpt from my personal diary, September 27, 1999).

The above excerpt from my personal diary reveals my early frustration while attempting to collect data and indicates a major turning point in how I went about accomplishing my research goals. Prior to leaving for Guatemala, I prepared a proposal that outlined, among other things, methods that I planned to use to accomplish my goals including interviews, life histories and participant observation. I will outline these briefly, describe how they worked and what I actually did to collect data.

During the initial stages of my fieldwork I intended to use interviewing in conjunction with participant observation to develop rapport with participants, to explore issues (Agar, 1996; Bernard, 1995; Bulmer, 1983; Fontana and Frey, 1994; Hammersley and Atkinson, 1995, Spradley, 1979), to determine who was involved with natural dye production and use within the Artesania Peréz and to develop more specific questions relating to my research goals. The use of informal interviews is characterized by a complete lack of control over the

situation by the researcher (Bernard; Berg, 1995). Douglas (1985) describes the informal interview as an informal talk or a chit-chat which differs from (semi)formal interviewing that is based on a stimulus-response paradigm (Mischler, 1986).

Mischler (1986) notes that reliance on more formalized interviewing, defined by the use of a question schedule, is problematic for research because the responses are unconnected from essential socio-cultural grounds of meaning. Further, such interviews avoid potential problems of context and plurality of respondent meaning by reducing the possible responses, and are not a meaningful speech event between participants (Mischler). Engaging in a conversation rather than a structured interview also deals with the issue of the interview as perpetuating hierarchy (researcher subject and researched object) and Oakley's (1981) claim that there is "no intimacy without reciprocity" (p. 49). By talking with the women, including answering their questions about myself, instead of following a set pattern of questions, I had hoped to build rapport and increase the breadth of data.

The twenty-three primary interviews that I conducted with women in the *artesania* over the first three months I was in Guatemala resembled semi-structured interviews, "listing questions and topics that need to be covered" (Bernard, 1995, p. 209) rather than the informal interviews I desired. I found the women that I interviewed hesitant to discuss themselves and their families without answering specific questions, for example 'Are you married?', 'How many children do you have?' and 'Are you familiar with plants that are used to colour textiles?'. Once a question was asked, the women answered it without expanding upon it and then waited for the next question. I always ended each interview by asking the women if there was anything that they wanted to know about me or to tell me about themselves. In this way I was able, to a limited extent, to incorporate the principles of informal interviewing into my interviews with women in the *artesania*.

A number of these interviews were facilitated by the use of an interpreter, a natural dyer and vice president of the *artesania*, fluent in Tzutujil and Spanish. Out of the twenty-three primary interviews that I conducted with women in the *artesania*, seventeen women spoke only Tzutujil, five women used Tzutujil as their primary language but felt comfortable with Spanish as their second language and one member spoke Spanish exclusively. I had begun studying Spanish in Canada and augmented my knowledge of grammar with a two-week intensive Spanish language course in Xela at the beginning of my fieldwork period. Upon engaging my interpreter I explained what I expected and required from her including confidentiality of both the participant's identities and my discussions with them, and simple translation of responses without prompting or embellishment[22]. In the cases of my first three interviews, I received the same reply from the women and realized that I may not have explained well the first time what I required of my interpreter[23].

I met with greater success using informal interviews with men in San Juan La Laguna. However, this success was limited as I was only able to hold meaningful conversations with two men, one living in my household and his father. I interviewed both men without using an interpreter as both were fluent in Spanish. I asked one *artesania*'s spouse, whom I was told by his wife would be most receptive to my request for an interview, but he replied "*I* don't have time for this *I* have to go to work so that like you my children can go to school"[24].

The limited success of using interviews to collect data may have been due to a combination of factors including gender, cultural perceptions of the method and the "lack of

[22] I was concerned about the possibility of her providing answers for the women.
[23] The first three replies were almost identical in wording and were concerned with the *artesania*'s lack of an external market. My interpreter's position as the vice-president in the *artesania* and president's daughter-in-law led me to suspect that she was giving the women answers rather than simply translating the women's responses. After I explained for a second time that I wanted her to simply translate to the best of her abilities what I said and what the women said the women's answers varied.
[24] I later found out, through the local grapevine, that my inactivity at the expense of my father (perceived) bothered him and this is why he declined to participate.

status congruency between the respondent and interviewer" (Bulmer, 1983, p. 210). Bulmer points out that, in developing countries among the women and the poor, resistance to participate in an interview may be encountered due the fact that these people are marginalized which may result in poor self-perceptions. My higher status as a wealthy foreigner, and the status of my interpreter, the vice-president of the *artesania*, may account for some of the women's reserve. In the case of males that I was able to talk with, my social position was lower, as a woman, or, at best equal, as a wealthy foreigner.

I collected partial (see below) life histories from key participants with the intention of providing "an integrated picture of the target culture" (Fetterman, 1998, p. 484). The participants from whom I collected life histories were all women in the Artesania Peréz including the oldest member, the president and a natural dyer. Collecting life histories from these three women gave me a better understanding of their lives, the functioning of *artesania* and the role that natural dyes has played. Integrating the women's life histories with the published literature, concerned with all aspects of life in Guatemala, facilitated the identification of reciprocating influences between the social and natural environments. I was able to use the milestones in the lives of the three women to provide chronological accuracy of events that they related that had occurred in the *artesania* and San Juan. It was then possible to chart their histories on the timelines, for example, the social or political histories of Guatemala, constructed in the published literature.

The reason I collected only fragments was the time requirements for all participants, including myself, involved with the collection. I taped twenty-three hours (three, eight and twelve from the three women respectively) but found it impossible to keep up with translating in the field. One woman observed that it was difficult to maintain a narrative with continual interruptions from members of her household. I collected life histories when participants

were amenable and returned to Canada with eighteen hours of life histories still to be translated.

Participant observation is noted by many authors (Agar, 1996; Bernard, 1995; Fontana and Frey, 1994; Hammersley and Atkinson, 1995; Spradley, 1980) as a key to establishing and maintaining relationships, trust or rapport, with research participants. The ever critical rapport I sought was occasionally a struggle between attempting to retain some independence and identity and attempts to create the "harmonious relationship between ethnographer and informant" (Spradley, 1979, p. 78). I empathize with Briggs (1970) who reflected on the conflict between her roles as ethnographer and adopted daughter and Young Leslie (1998) whose "position as "anthropologist" confronted (her) position as "mother""(p. 45). I experienced a conflict between who I thought I was and how I perceived that I was viewed by Juaneros.

"The participant observer comes into a situation with two purposes: (1) to engage in activities appropriate to the situation and (2) to observe the activities, people, and physical aspects of the situation" (Spradley, 1980, p. 54). My social status, language skills and lack of natural dye knowledge at the beginning of my fieldwork in San Juan resulted in my reliance on observation. However, even as my social status changed and my skills increased, enabling me to employ different methods described in this chapter, observation remained an important tool for the collection of data (see below).

I did not want to simply watch the women making natural dyes but wanted to experience it. I wanted that tacit knowledge, not easily articulated, that may become apparent to the researcher through participation (Dewalt, Dewalt and Wayland, 1998). Participating as actively as the circumstances and context of involvement permitted would give me an understanding of cultural rules of behaviour by doing what others were doing (Dewalt et al.;

Spradley, 1980). The selection of participant observation as a research technique also addresses the fact that the transmission of indigenous knowledge occurs in non-verbal ways as well as through verbal interaction or instruction (Ruddle, 1993).

Spradley (1980) identifies a continuum of the degree of participation that a researcher may employ: nonparticipation, passive, moderate, active and complete participation. The degree of participation depends upon personal characteristics of the researcher as well as the circumstances and context of involvement (Dewalt et al., 1998). I wanted to participate actively. I wanted to do what other members of the community were doing to gain an understanding of cultural rules of behaviour (Dewalt et al; Spradley, 1980). However, I avoided situations in which I felt uncomfortable, such as local church activities and *artesania* politics. After a short time in the village, I realized that the decision to actively participate was not mine alone. I needed permission to engage in some activities (see below). There were some activities that I was never permitted to actively participate in, for example, putting dyestuffs into the dyebath.

I did what I could to assist with meal preparation and tried to keep up with domestic tasks such as my laundry and cleaning my bedroom and the common room. These are activities that all Juaneras do on a daily basis from the age of eight. My first attempt at helping with the cooking failed and the women's belief that I was inept was confirmed when I watched helplessly as a dyebath boiled over. My attempts to do my laundry during the first week in San Juan were equally disastrous as I had difficulty with the stone washboard basins and ended up tearing a shirt and scraping my knuckles. My housecleaning was described by one woman as haphazard. The women in my household always frustrated my attempts at

self-sufficiency in these areas by re-mopping my floor or taking clothes away from me and I ended up compensating different women for taking care of these tasks for me[25].

My inability to execute tasks of everyday life supported the perception that I was a child, socially and culturally, in the social reality of Juaneros. In a discussion with the president and four other members of the *artesania* on my first trip to San Juan, a week before I took up residence, I explained to them that I wanted to learn about natural dyes and that I wished to participate in the dyeing processes. They agreed and said that I would also learn how to make tortillas and weave. I agreed, wanting to take part in their daily lives. I did not realize until after I returned to Canada, just how learning these skills affected the degree to which I was able to participate in the production and use of natural dyes.

The first time I watched the preparation of natural dyes was in late September. I was told to sit down and watch with a dyer's two daughters, aged two and nine. After my first attempt to make tortillas, it took two weeks before the natural dyers would leave me to tend the fire under the dyepot. After proving that I could tend the fire safely, I was allowed to stir the dyepot without one of the dyers taking the stirring rod from me. A month after my first attempt to make tortillas, my household was thrilled when I finally made my first perfect tortilla. At which point, the women pronounced that I was ready to begin weaving. Prior to the completion of my weaving, the dyers would not allow me to take the yarns from the dyepot or wash them. By the end of December, upon completion of my first textile, I was encouraged to fully participate in natural dyeing processes. My activities followed the

[25] This was difficult for me as on one occasion I was asked if one of these women was my servant. I felt like I was supporting structures of poverty and inequality (see also Wolf, 1996). It is possible that my marginal domestic abilities were exaggerated by the women so that I would employ them for the tasks. On the whole these arrangements suited me as it kept harmony within my household and I had more time for natural dyeing related activities.

informal education of girls as they are prepared for marriage and transcend into womanhood[26] (see Barrios, 1997).

Aside from participating in the preparation and use of natural dyes, I also accompanied a natural dye harvester on two dye collection trips into the mountains. Due to the fact that men are commissioned by the *artesania* to collect dyes, I had to obtain permission to accompany them. At first when I discussed my desire to accompany the men, the president discouraged me because it was considered dangerous and socially unacceptable for me to go into the mountains alone with a man. I was finally able to make arrangements to harvest natural dyes with my translator, a natural dyer in the *artesania*, and her brother who is employed by the *artesania* to harvest dyes in the mountains. I was not permitted to harvest dyes while collecting in the mountains as the harvester said that he was afraid I might injure myself. I used a video camera to record his activities and the commentary he provided throughout the process.

After completing my first textile, I was referred to as a daughter or sister by members of my household. They began to enter my bedroom without waiting for a reply to enter, just as they would any other family member and I was able to go into the mountains with my 'brother-in-law', a dye harvester for the *artesania*, without a chaperone. I was encouraged to do things while working with natural dyes that the women previously said that I could not do because they were too difficult, such as removing yarns from the dyebath. People no longer insisted that I be accompanied when leaving town, in fact they hardly mentioned it at all instead wishing me a happy and safe journey. I no longer had to ask what the women were talking about when they 'gossiped' in Tzutujil. By the end of my fieldwork period in

[26] This unexpected finding illustrates the cultural implications surrounding the production and use of natural dyes. However, this was outside the scope of my research and needs to be addressed by future research.

January, someone always kept up a running commentary that I could understand and translated my inquiries or responses. At this point women who wished to speak to me did not go directly to my hostess-mother but talked to me in the street or asked me directly if I would come see them.

The research experience that I acquired in Guatemala went beyond simply answering the research questions that I set out that pertain to natural dye production and use. The practical activities for data collection that I originally proposed to use were geared towards achieving my research goals. However, I had to learn to perform the practical activities within the research context before I could answer the research questions. I had to learn to apply different methods of data collection and in what circumstances these were appropriate and useful.

Limitations

There were issues that I encountered during my fieldwork that may be viewed as research limitations. These include time, language and my social position in San Juan La Laguna. Time is concerned with the restriction of my fieldwork to five months, and language with the necessity of using the second language of research participants, including myself, in all communications during this period of time. The issue of neutrality refers to my perceived alliance with the household of the president of the *artesania*.

My residence in Guatemala was restricted to five months due to economic restrictions and personal obligations. This imposed a limitation on my participation in dyeing activities. I was able to participate in the range of dyes that were active only from September to January (see Chapter Five). However, I documented dye processes that I was unable to witness through discussions with natural dyers in the Artesania Peréz.

The fact that I was unable to speak Tzutujil and that the majority of my research participants were unable to speak Spanish was a limitation. I employed an interpreter fluent in Spanish and Tzutujil to overcome the language barriers in my research. I chose not to employ an interpreter fluent in English, Spanish and Tzutujil as there were no Juaneros able to speak English proficiently and after three weeks of immersion in the Spanish language I felt comfortable with my abilities to conduct research. The formal Spanish that I learned differed from the 'local' Spanish, that many Juaneros learned from watching Mexican soap operas; making communication difficult in my first weeks of fieldwork.

The necessity of using an interpreter was a limitation on the research. Her position in the *artesania* possibly affected the responses that I received from *artesania* members. However, the employment of another person, within or outside the *artesania*, may have affected participant responses as well in ways that I can only speculate on[27]. Throughout my fieldwork I studied Tzutjil and by the end of December was able to understand the general topics of conversations. The greetings and other simple phrases that I learned in Tzutujil had a positive effect on research participants. In the words of an *artesania* member, "you are making the effort to communicate with us in our language and in our houses, others made us come to them and spoke at us in foreign languages through people we did not know. You are trying to learn and this is good". I tried to make participants as comfortable as possible, under the circumstances, with my research activities.

I was, and still am as I write this account, concerned about the effects of my perceived alliance with the president of the *artesania* by living in her household and employing her daughter-in-law as my interpreter. However, I also had to be careful not to

[27] I was expected by the board members of the *artesania* to employ their members when I required research assistants as a way of recompensing them for their participation in the research.

offend the president of the *artesania* as she had the power to ensure that none of the women talked to me or shared their natural dye knowledge with me. As it turned out, her daughter-in-law was the person in town who spoke the most freely to me. There was reluctance on the part of women to speak freely about my hostess. This may have been due to the fact that she was my hostess/mother or because she was the president of the *artesania* and had financial control.

I believe now, as I did while conducting my research, that the positive aspects of my living arrangements exceeded the negative. Natural dye knowledge, within the *artesania*, was a family secret and only women who were related to the president had access to this knowledge. Living in the household and eventually becoming an adopted member of her family ensured my access to natural dye knowledge. The spatial closeness to the president, the centre of the *artesania* and natural dye knowledge, ensured that I was included in spontaneous activities, such as meetings, that I may not have been able to witness.

Residence within the household also ensured my safety against the infrequent robberies and assaults that occurred during my stay. If I had to go anywhere that was considered potentially dangerous, my family ensured that I did not leave without an escort. They also took it upon themselves to monitor my health and on one occasion had it not been for their ministrations I would have been required to return to Canada[28].

Alternate Ways of Knowing

The goal of my research was to explore indigenous knowledge as it relates to natural dyes used in textile production. I wanted not only to document the dyes and processes but to

[28] Halfway through my time in Guatemala I had problems with my stomach, the medical doctor that I went to diagnosed amoebic dysentery and gave me two courses of antibiotics. They did not work and only after the women applied salves and gave me traditional medicines did I believe that I would live.

gain insight into indigenous knowledge as an "integrated system of knowledge, beliefs and perceptions" (Berkes, 1993, p. 5) based on interactions with and observations of their environments. The holistic approach to indigenous knowledge is expressed in feminist studies which "tends to celebrate feeling, belief and experientially based knowledge" (Stacey, 1988, p. 22).

This experientially based knowledge is evident in Steiner's (1995) discussion of the transpersonal dimension or Human Ecological Traffic Light (Figure 6). Human consciousness is divided into three parts: heads (discursive consciousness), hands (practical consciousness) and heart (unconscious) (Steiner). Steiner states that the "fragmentation of reason is typical for a male type of consciousness (p. 45) while "a female type of consciousness can be suspected of being more relational, i.e., of a kind where there is better integrated interplay between 'heads, hands and heart'" (p. 45). A debate on female versus male consciousness is unnecessary as the importance for this research is the acknowledgement of the fact that it is with the heads, hands and heart that people relate to the external environments (Steiner).

Niessen's (1994) reference to the tripartite division in Tedlock and Tedlock's (1985) work on Quiché Mayan textiles is also relevant to the discussion on alternate ways of knowing. "A three-layered intertextuality operates within and between three different arts, uniting the domains of language and technology in the process: the quotation of words from an ancient text, the interplanting of additional crops in a cornfield, and the brocading of designs in a textile" (p. 126). Niessen (1994) discusses the limitations of viewing the textile as text, based on her work with the Toba Batak of Sumatra, stating that she believes "the women's sphere will likely be discovered not in the texts of weaving, but in the tasks of weaving" (p. 127). She goes on to question "where Batak women's voice may be heard" and

questions whether collapsing text and textile is "logocentred (voice and discourse) hiding alternate ways of knowing inherent in technical practice" (Niessen, 1994, p. 133).

These alternate ways of knowing may be situated in the practical rather than the discursive conscious. Women's knowledge is not only in the language of the activity but in the activity itself. Furthermore, it is not the voice that imparts this knowledge, for weaving is non-verbal, but the interaction between the hands and the materials. My own research experience substantiates these insights as my learning process was centred in the non-verbal. I was told to watch as the other girls did, and to gradually participate following the learning pattern of growing women.

Discussion

The use of interviews, collection of life histories and participant observation enabled me to apply theoretical knowledge and convert this into practice and experience. Flexibility, noted by Young Leslie (1996) as a key to good fieldwork, was built into the research by using a variety of data collection methods. The methods that I used, once I had some sense of their positive and negative aspects, in any given situation, were based on the circumstances of the activity and participants involved. As discussed above, there are diverse ways that knowledge, indigenous and women's knowledge particularly, is transmitted. Testing the appropriateness and feasibility of various methods was accompanied by an exploration of potential transmission paths of knowledge.

Men and women have "different ways of preserving and transferring knowledge" (Fernández, 1994, p. 2). The issue of gender is not addressed by many authors (see DeWalt, 1994; Purcell, 1998; Stevenson, 1996) concerned with indigenous knowledge (Fernández, 1994; Grenier, 1998). Based on my experiences described above, women's dyeing

knowledge is transmitted non-verbally while the man that harvests dyes shared his knowledge verbally while demonstrating. Zweifel (1997) notes that "in some cases they [scientists] fail to perceive women's knowledge as real knowledge, often referring to it as 'primitive' and 'intuitive'"(p. 2). This marginalization of women's knowledge may be due to, among a variety of other things, collecting data in ways that fail to engage the practical consciousness and unconscious. The discussion of alternate ways of knowing illustrates the link between the theoretical approach (see Chapter Three) and the practical research activities described in this chapter. The integration of practice and theory enabled me to engage in this research with my heads, hands and heart (see Figure 7), as the women experience their lives and impart their knowledge.

The transmission of indigenous knowledge was a key issue for the research into natural dyeing by the Artesania Peréz. Primarily, I wanted to explore natural dye knowledge and in order to accomplish this goal I had to learn in ways described above. The use of a variety of methods for data collection enabled me to employ methods appropriate to different research situations. Secondly, I discovered through research activities that transmission of knowledge is a factor that influences, and is influenced by, the environments that I undertook to investigate. These are explored in the following chapters.

Chapter Five: Natural Dyes

Introduction

The goals of this chapter are twofold. The primary goal is to provide an inventory of natural dyes that are being used in San Juan La Laguna by the Artesania Peréz. Situating my findings within the published natural dye literature is the secondary goal of this chapter. The description of these dyestuffs enables the discussion in succeeding chapters about the social organization of natural dye use and interaction with the natural environment. It is important to note that the Artesnia Peréz does not own land on which to grow natural dyes. They obtain their dyestuffs from a variety of sources (see below). Conditions of the dyestuff collection described in this chapter, such as the techniques and social arrangements, are explored further in the following two chapters.

I found four published sources, Carlsen and Wenger (1991), O'Neale (1945), Osborne (1965) and Reiche (1999), that deal specifically with Guatemalan natural dyes. The inventory of natural dyes used in Guatemala between 1840 and 1950 presented in the article by Carlsen and Wenger was based on laboratory analysis of textiles in ten museum collections. Osborne devotes a chapter to natural dyes in "Indian Crafts of Guatemala and El Salvador". The basis of Osborne's inventory of dyes is not stated in the book but presumably was a result of her residence in Central America. Published in 1945, O'Neale's book "Textiles of Highland Guatemala" contains a section on natural dyeing techniques and dyes. Based on a five month period of fieldwork O'Neale discusses one natural dye used with cotton in Salcaja (see Figure 1) and six used for dyeing wool in Momostenango (see Figure 1). Reiche's (1999) "*Manual de Tintes Naturales*"[Manual of Natural Dyes] is based on a ten-day workshop on natural dyes in Momostenango, in which she took part.

There are two major issues related to these articles, illustrating the need for conducting research in Guatemala rather than basing the research on a literature review. First, Carlsen and Wenger (1991), and Osborne (1965) (in this case I am referring to her inventory of dyes used with cotton) rarely name the location of the production and/or use of the natural dyes more specifically than Guatemala, or in the case of Osborne Guatemala and El Salvador. Although O'Neale (1945) provides both the origin of natural dyes and their location of use, none of which are San Juan La Laguna, her natural dye inventory is concerned mainly with natural dyes used on wool[29] with chemical mordants. Reiche's (1999) manual includes a list of dyes that were, presumably, used during the natural dye workshop. However, Reiche does not, for the most part, state where the dyes were obtained or which dyes could be found in Momostenango. Second, both O'Neale's and Osborne's accounts of natural dyes in Guatemala are simply one aspect of their consideration of Guatemalan craft rather than the focus of their studies. The final point of concern is the dates of the publications. Reiche's publication is representative of the recent encouragement of the return to natural dyes. However, many changes have taken place in Guatemala since O'Neale's and Osborne's accounts were published and the textiles, which formed the basis of Carlsen and Wenger's study, were produced.

In order to support and clarify my findings relating to natural dyes used by the Artesania Peréz, I expanded the literature base beyond the three articles that are described above. This expansion includes natural dyes used in Central and South American countries, and a variety of sources listing characteristics, properties and general uses of flora in Central America. In the published literature, the names of dyestuffs are given in English, Latin,

[29] The different chemical and physical properties of cotton (cellulose) and wool (protein) fibres will influence the final results of the dyeing process, for example colour.

Spanish or some combination thereof but rarely in a consistent manner. I will refer to dyestuffs by their English names, where possible, or using Spanish terms used by natural dyers in the *artesania*. Scientific names, referred to in Table 1, will not be used as within one family, referring to taxonomic classification, there may be a number of possible genus and species that fit the description of the dyestuff.

The term 'natural dye' is used extensively in the published literature but never defined by the various authors. Combining the terms 'natural' and 'dye' from the Oxford English Dictionary (1999) the definition of a natural dye is "a material of matter used for dyeing... (out of) matters having their basis in the natural world or in the usual course of nature" (p. 1). This definition is suitable for the purposes of this research. The literature focuses on plants, including shrubs and trees, on insects and on shellfish. The categories of natural dyes that I use for my research are trees, fruits, plants, vegetables and indigo. These categories are not mutually exclusive but are consistent with the categories used by research participants involved in natural dyeing.

Trees

Tree parts comprise the category of dyes, which are the most widely used by *artesania* dyers, and one of the least mentioned in the published literature. The *artesania* uses leaves, fruit and bark from trees although Berni, Bolza and Christensen (1979) mention that heartwood and deadwood may also be used as dyestuffs. The *artesania* uses the different parts of dye trees to produce a variety of shades of red, brown and green. I recorded four natural dyestuffs extracted from trees being used in San Juan La Laguna that are not found in the published literature.

Table 1 Names, Location and Type of Dyestuff

Spanish Name	Alternate Names	Scientific Names (Genus and Species)	English	Tzutujil	Location of Dyes (relative to San Juan La Laguna)	Object Type	Parts Used for Dyes
Achiote		Bixa orellana		K'uxu'	local	tree	seeds
Aguacate		Persea americana	Avocado	ooj	local	tree	leaves
Aguacalipto					local	tree	
Cedro		Cedrela odorata C. mexicana C. guianensis	Central American Cedar		local (scarce)	tree	heartwood
Chilca		Senecio salignus		mejtaq'a'	Local	shrub	whole plant above ground
Cochineal		Coccus Cacti Coccinelliferi			unknown in area	insect	whole insect
Coco		Cocos nucifera	Coconut		Pacific Coast	fruit	husk from fruit
Cola de Leon	Barba de Leon, Mano de Leon	Cuscuta american L			Local	vine	whole vine
Encino	Palo encino	Quercus spp		pijxk'	Local	tree	bark
Flor de Muerto		Tagetes erecta L		pajrutz'	Local	flower	flower petals and seeds
Grenada	Granado	Punica granatum	Pomegranate		Local	fruit	whole fruit
Injerto	Zapote (Sapote) Verde			tuulul	Local	tree	bark, seeds from fruit
Ilamo				lema'	Local	tree	bark
Nance		Byrsonima crassifolia (L)		pa'l	local (three trees) Xela	tree	bark

Table 1 (continued) Names, Location and Type of Dyestuff

Spanish Name	Alternate Names	Scientific Name (Genus and Species)	English	Tzutujil	Location of Dyes (Relative to San Juan La Laguna)	Object Type	Parts Used for Dyes
Palo de Matos	Mata Palo	Ormosia			Local	tree	
Palo de pito		Erythina spp.			Local	tree	bark
Pulpa de café		Coffea arabica		kape (coffee)	Local	bush	outer bean husk
Remolacha			Beets		Sololá	vegetable	whole vegetable
Rosa Jamaica					Sololá	flower	flower petals
Sacatinta (Tree)			Indigo		Local (1 tree) Antigua and Tzunil	tree	berries
Sacatinta (Plant)			Indigo		Local (1 plant)	plant	whole bush
Sacatinta	Kilete		Indigo		San Pedro	bush	whole plant above ground
Zapote	Sapote			sapóote	Pacific Coast	fruit	fruit

Bark taken from *palo de pito* produces a yellow dye that is good for cottons (Osborne, 1965) but is not currently used by the *artesania*. One of the natural dyers said that she tested the bark to determine if it would produce any colour. She was able to produce a yellow dye but further tests revealed potential skin problems[30] for the dyers working with *palo de pito* bark and people that wore or used textiles dyed with the bark. The natural dyers in the *artesania* decided to discontinue the use of this dyestuff.

There are two types of avocado trees that natural dyers were able to identify growing near San Juan La Laguna. The trees of the more abundant species have silver leaves and are larger than the species used to produce dye. Avocado trees of the second type with smaller green leaves are more plentiful in areas with warmer climates than San Juan La Laguna. The dyers use the leaves and live branches of the latter species, in combination or separately, to produce a green dye. Reiche (1999) notes that avocado dye produces brown but she does not state which part of the tree was used.

The *artesania* dyers said that, in the past, they used the heartwood of a cedar tree to produce a purple dye. There is no reference to this tree as a dye in the literature but it is described as the "most extensively used wood for general construction and carpentry of all types" (Longwood, 1961, p. 48). One natural dyer noted that cedar trees in the area are so few that the local police often watch a grove of these trees to ensure that they are not taken down. It is uncertain whether the police were guarding these trees because they are endangered or at the request of the owner.

Palo encino or *encino* is a tree that grows abundantly in the vicinity of Lake Atitlán. The bark of this tree produces a red-brown dye similar to the colour of bark that has been

[30] The issue of the health of the natural dyers and people that wear the products, although important, are beyond the scope of this research.

freshly harvested. The trees that the *artesania* take bark from include ones owned by relatives of *artesania* dyers and those located on communally owned, or wild, land[31].

There is a place near the village that has been named *'Lugar de Siete Injertos'* [Place of the Seven *Injertos*] after an abundant source of yellow-brown dye. The bark is obtained by men, commissioned to harvest dyes for the Artesania Peréz, in the surrounding mountains when *injerto* owners in town do not wish to sell bark from their trees. Tree owners are most reluctant to sell the bark in July and August when the fruits are ripe and removal of the bark makes it difficult to climb the tree and remove the fruits.

Ilamo is another tree growing abundantly in the immediate area of San Juan La Laguna. It is available all year round and produces a red-brown colour. Men are sent by the *artesania* president into the mountains to collect this dyestuff from communally held land or by special arrangement with *encino* tree owners. The grove of trees that the *artesania* relies on as their source of *encino* bark is scheduled to be clear-cut by the owner for cultivation. The *artesania* dyers hope that he will allow them to take all of the bark from these felled trees for use as dye.

Bark from the *nance* tree produces a red hue and is relatively scarce around San Juan La Laguna. Reiche (1999) notes that brown may be obtained from *nance*. One natural dye collector stated that this type of tree is scarce due to the fact that San Juan's climate is not the most nurturing for *nance*. That the two known live *nance* trees were used extensively by numerous people, including the Artesania Perez, was evident from the amount of bark that had been stripped. A third *nance* tree located in San Juan La Laguna is dead as the owner of the tree stated that she had stripped a majority of the bark to sell as a cure for toothaches. As

[31] Areas of jungle that do not belong to anyone specifically are referred to as communally owned properties.

it is difficult to acquire *nance* in sufficient quantities the *artesania* president noted that she often purchases it from Nawala, a municipality of Xela (see Figure 1), where it is more abundant.

Fruits

Fruit from trees are also employed as dyestuffs in Guatemala (Osborne, 1965). *Zapote* is an evergreen tree widely cultivated in South America for its fruit (Roys, 1967; Towle, 1961) and produces a violet purple from the peel (Osborne). *Zapote* is used by the *artesania* when available as they must commission a man to bring this fruit in from the Pacific coast of Guatemala.

Fruit from the annatto tree is used to produce a brilliant yellow-red (Osborne, 1965) or orange (Reiche, 1999). This fruit is referred to as seeds by Donkin (1977) who notes that the dyestuff was a trade item throughout the highlands. Annatto is a tree able to produce brown pods that contain seeds used by the *artesania* to produce a brilliant orange. It is available in the markets of San Juan La Laguna and surrounding villages. The president of the *artesania*, also a natural dyer, stated that she tells the woman who sells annatto in San Juan La Laguna that it is used for soup. The president believes that if the annatto merchant knew it was for dyes she would raise the price.

Pomegranate is used by the *artesania* to produce purple dye. The availability of this fruit depends on the length of the rainy season but tree owners stated that the fruit is usually ripe in September and October. There are four pomegranate trees in San Juan La Laguna and at least eight more in the neighbouring village of San Pedro La Laguna (see Figure 2). I was given the opportunity to count the trees when the president of the *artesania* asked me to accompany her daughter-in-law, another natural dyer, to purchase the fruit. The long rainy

season, tree owners said, was at fault for the few miserable looking fruit that we were able to obtain.

Coconuts are used as natural dyes but grow only in coastal climates. The fruit is seasonally available in March, April and May. The *artesania* usually commissions a man to bring back a large bag full from the southwestern coast of Guatemala. The brown husks are used to produce a brown dye. I was unable to observe the production of coconut dye as I left two months prior to its period of use.

The pulp of coffee is a dyestuff that abounds in San Juan La Laguna in February and March when coffee beans become bright red signaling that it is time to begin processing. Coffee pulp is a 'waste'[32] product produced when extracting the coffee bean from the outer shell. This use of the dyestuff is the result of an experiment. One dyer wondered whether the colour of the drink could be reproduced. She tested it and found that coffee pulp produced a dark brown fixed colour on cotton.

Plants

Chilca, a small bush that grows plentifully in the wild, is used for producing yellow (Osborne, 1965; Towle, 1961) and green dyes (Towle). This leafy bush grows wild throughout the Lake Atitlán area and natural dyers said that the leaves and branches of this plant may be used to produce a green dye. *Chilca* grows during the rainy season, approximately May to September, and is best collected during this period.

Cola de leon is a yellow vine that grows locally in San Juan La Laguna and is often cleared as a weed. It grows during the rainy season and, although it is available all year,

[32] The use of the word waste refers to waste from coffee processing. It is misleading as the pulp is used as a dyestuff and organic fertilizer and in these contexts is not waste.

dyers stated that the best time to get it in the mountains is in September and October. This vine produces a yellow or orange dye (Reiche, 1999). There is one specific plot of land within the village where the vine is abundant and inquiries were made, by myself and a member of the *artesania* on separate occasions three months apart, to purchase it. Our queries were met with hesitance on the part of the owners and in both instances the vines had been removed by the next day. These curious incidences I discovered were the result of poor relations between the owners of the plants and a member of the *artesania*.

In the months of October and November, *flor de muertos* grows wild along the road leading to San Pablo La Laguna (see Figure 2). These flowers are named for the day of the dead, November 1st, when people visit the town cemetery taking these flowers with them to place on gravesites. The natural dyers in the *artesania* only use the flower petals, with the seeds attached, to produce orange dye. I accompanied one natural dyer to collect *flor de muertos* and after a day's work we collected enough to dye two or three pounds of thread. The president did not think that the amount we collected was enough and purchased bunches of the flowers in the market of Sololá (see Figure 2).

The president of the *artesania* stated that there are two types of *rosa jamaica*. The flower that I purchased in a market in Santiago Atitlán grows on the Pacific coast and does not produce dye. The *rosa jamaica* purchased by the president in Sololá grows in colder climates and is used to produce red-purple dyes by natural dyers in the *artesania*. The natural dyers stated that the flower can only be obtained in September, October and November when the rainy season ends requiring them to purchase large amounts of flowers so that they can store them for later use.

Vegetables

The published literature on natural dyes makes no reference to vegetables, foodstuffs that are commonly used as natural dyes in Guatemala. In order to produce red, the *artesania* does make use of the roots, leaves and stem of beets. Beets are available in markets of surrounding towns and are purchased by the *artesania* in Sololá. The brilliant red produced by beets is similar in hue to that produced by *rosa jamaica*. Its use as a dyestuff is the result of an experiment. One of the dyers made a dyebath of beets and found that cotton yarn held the colour.

Indigo

Sacatinta or *Zacatinta* is the name of an evergreen shrub with berries that are used as a blue colouring matter throughout Central and South America (Wipplinger, 1985). *Jacobinia Spicigera* is also known as *sacatinta* and is used to produce a blue dye (Osborne, 1965; Reiche, 1999). Indigo, a third plant commonly known as *sacatinta* (Osborne), is perhaps the most well known and widely used natural dye. The threefold meaning of *sacatinta* is confusing. Wipplinger (1985) mistakenly uses *Jacobinia Spicigera* and *Indigofera* species interchangeably in her discussion of Mexican natural dyes. *Jiquilite*, referred to by Reiche, is another plant used to produce blue in Guatemala. Presumably, this plant contains indigotin. However, the plant is not described by Reiche and she does not give the scientific name. This makes it impossible to determine whether *jiquilite* is a location specific term, i.e., it has a different name elsewhere, or is specific to a plant that she was the first to make note of.

Indigo dye is generally produced from plants belonging to the genus *Indigofera* (Alcorn, 1984). *Indigofera I. suffruticosa, Indigofera I. añil* are noted as species of indigo

common to Central and South America (Alcorn, 1984; Sandberg, 1989). Indigo plants generally grow to a height of six feet (Osborne, 1965) and resemble "shrubs with dull green feathery leaves, and with clusters of small coppery-pink flowers resembling those of pea and bean plants" (Ross, 1987, p. 44). Two of the accounts used to reconstruct indigo production focus on Mexico (Ross, 1987; Wipplinger, 1985) while the other (Sandberg) is not geographically specific.

The *artesania* currently uses three different types of indigo all referred to by the same name. To differentiate between the three types of indigo, *artesania* dyers called them *chibolitos, kilete* and *sacatinta*[33]. I differentiated them by their appearance, as one is a tree with berries, the second a leafy bush with yellow-green leaves and the last a small shrub with orange flowers. I refer to them in this manner below. It is difficult to determine the precise species as there are hundreds of species of indigo that contain indigotin and may be used to produce blue dye. Gerber (1977) notes that there are over 350 species of indigo, presumably worldwide, 23 of which are used as dye material. Wipplinger (1996) claims that there is a higher number in the Americas alone, "over 275 varieties of plants" (p.39).

Berries from the indigo tree produce a colour ranging from a light bluish purple to a dark blue-black. The darkest shade produced by this indigo is considered the true indigo colour by the *artesania* dyers. In isolated instances[34] these trees may grow wild and provide a few berries. However, the president of the *artesania* said that the best indigo crops are grown near the town of Antigua or the village of Tzunil (see Figure 1). One of the natural dyers in San Juan La Laguna told me the story of the man that owns the only known tree in the municipality of San Juan La Laguna. One day he came into town with a bag containing

[33] The first word translates as berries and the last as indigo of the cornfield. The second is unknown.
[34] On our way to collect bark dyes in Palestina, an *aldea* of San Juan La Laguna, we came across one small tree growing by the side of a dirt road.

approximately 10 pounds of the indigo berries and sold it to her for 5 Quetzals. The next time she met him, 5 or 6 years later, he had another bag of indigo berries and was asking 25 Quetzals a pound. She told me that she asked him why the price had risen so dramatically and he replied that he now knew what they could be used for and he knew other women would pay the higher price.

The second species of indigo, referred to as *kilete* by the *artesania* dyers, consists of a single bush with yellow-green leaves that is grown in San Pedro La Laguna. I went with a natural dyer from the *artesania* to inquire if we could purchase some of the leaves that are used to make dye. The owner of the bush said that he could sell us only about two pounds from his bush as a woman from San Pedro La Laguna had purchased leaves for medicinal purposes a few weeks earlier and he did not want to kill his plant. The few leaves that we were able to obtain we used for three successive dyebaths and produced, in order, dark green, blue and teal green. The inconsistency of colour within a single day of use was explained by two of the natural dyers as the result of using the indigo before it was seasoned. Indigo is generally ripe in late January to late February depending on the length of the rainy season.

A small shrub with sparse dark green leaves and orange flowers is called *sacatinta* by the natural dyers. Leaves and live branches are collected. Only one plant is known to exist in San Juan La Laguna and is owned by the president of the *artesania*. She said that she did not plant it but found it growing amongst their corn and will not let her husband remove it.

Dyestuffs from the Published Literature

There were also a few dyestuffs in the published literature not found in San Juan La Laguna. These include dyes from trees, insects and shellfish. I include discussion on these

dyestuffs for two reasons. The natural dyes described below are noted by various authors (see Carlsen and Wenger, 1991; Donkin, 1977; Gould, Howard & Rodriguéz, 1998; O'Neale, 1945; Osborne, 1965) as being used in Guatemala. Therefore, my discussion positions the inventory of natural dyes used in San Juan La Laguna within the broader list of natural dyes used in Guatemala. The second point, developed further in Chapter Five, is to illustrate the importance of providing specific locations for dyestuff origin and use.

Palo amarillo or fustic generates yellow dye when the shreds are boiled in water (O'Neale, 1945) but the part of the tree which is used is not discussed. However, it may be the heartwood of the tree which is a bright yellow (Berni et al., 1979). This tree was not known to the people that I talked to and it is not used as a dyestuff. Berni et al. state that this species of tree may be found throughout the American Tropics.

Logwood, known as *palo de campeche*, was named for the city of Campeche in Yucatan, a historically important source of the dyestuff as a valuable colonial export (Armstrong, 1992). Belize, formerly British Honduras, was colonized by loggers exploiting the rich resource (Armstrong) which extends into Guatemala. Currently, in Petén branches of the logwood tree are used to produce purple dye (Gould et al., 1998). Osborne (1965) notes that the bark of *palo de campeche* may also be used to produce dye. This species of tree was unknown to natural dyers and others that I spoke to in San Juan La Laguna.

Wipplinger (1985), in her discussion on Mexican natural dyes, claims that logwood can only be distinguished from brazilwood, both members of the genus *Haematoxylum*, by chemical means. Armstrong (1992) and O'Neale (1945) discuss both dyes as being similar but note no problems with distinguishing between the two trees. *Haematoxylum* means bloodwood and may refer to the dark red heartwood of the tree (Armstrong), the source of

dye. The use of brazilwood as a red dye predates Spanish arrival in South America (Donkin, 1977). Natural dyers and other Juaneros stated that they were not familiar with this tree.

Cochineal is the most commonly documented natural dye produced from insects in South America (Born, 1938; Carlsen and Wenger, 1991; Ciesla and Ciesla 1987; Donkin, 1977; Fleming, 1983; Lee, 1948; O'Neale, 1945; Osborne, 1965). The history of the cochineal insect is as rich and varied as the colours that it produces. The origin of the insect can be traced to Central and South America. Its use as a textile dyestuff was well documented during the Mayan and Aztec Empires (Donkin). Cochineal insects are small louse parasites classified as *Coccus Cacti Coccinelliferi* (Ellis, 1761) or *Dactoylopius Coccidae* (Fleming). The parasitic nature of the cochineal insect makes it dependent on a host to provide it with life sustaining nourishment. The host is called *nopalli* or nopal cactus which is actually the name of the genera that encompasses a number of species, all of which act as host to cochineal.

There are two different types of cochineal, *grana silvestre*, the wild variety and the cultivated cochineal, *grana fina*. The species of *grana fina* was the result of centuries of selective breeding of *grana silvestre* (Born, 1938; Ciesla and Ciesla, 1987; Donkin, 1977). The domesticated cochineal is larger than the wild insect, therefore producing more dye. However, the program of domestication produced an insect that depends completely upon human intervention for survival (Ciesla and Ciesla; Donkin). According to the literature, the cochineal host is also divided into wild and cultivated varieties (Born, 1938; Donkin).

Spanish authorities encouraged the expansion of cochineal cultivation in Guatemala as early as 1617 (Donkin, 1977). The industry prospered and by the mid-1700s cochineal production in Guatemala exceeded that of Oaxaca (Donkin). "Before 1840, cochineal had become one of the great staple commodities of Guatemala, gradually supplanting indigo in

the first place" (Donkin, p. 31). In 1853, the cochineal exported from Guatemala totaled 1.75 million pounds (Donkin).

During the 1860s, the decline of cochineal production was sharp due to competition for labour from coffee plantations (Carlsen and Wenger, 1991; Donkin, 1977). It seems that local use of cochineal as a dyestuff declined around the same time perhaps due to decreased availability as well as the introduction of alzarin, a synthetic dye (Carlsen and Wenger). Testing of dyes used in Mayan textiles during the period 1875 to 1927 show that alzarin was used in all of them (Carlsen and Wenger). Carlsen and Wenger state that "one of the more common myths about dyes used in Guatemalan textiles is that early red cottons were dyed with cochineal" (p. 369). This hypothesis deserves caution because the textiles in the study were made after cochineal plantations had been abandoned for coffee and synthetic dyes had been adopted worldwide.

Artesania members are aware of the use of cochineal as a natural dye and said that it may be obtained in Antigua, Guatemala (see also O'Neale, 1945). Reiche (1999) notes that cochineal is produced in Mexico and Peru. The president of the *artesania* mentioned that there were a few large groups of cacti within walking distance of the village. Accompanied by one of the *artesania* dye collectors, I set off in search of these cacti and, I hoped, cochineal. At each of the three sites we visited, the cacti were of the nopal variety covered with red fruits. The fruit can be used as food for animals or burned as a source of fuel, however, the nopal cannot sustain both cochineal insects and fruit.

Purpura is unique in the colour palette produced from natural materials as it can be obtained from shellfish. *Purpura murex* is a small shellfish that lives on rocky shores in the tropics, specifically on the Pacific coast of Central and South America (See Madrid, 1994). Its method of self-defense is the secretion of a clear liquid that turns green and finally purple

with oxidation. The liquid serves as an extremely colourfast dye that fades little with subsequent washings (Nuttall, 1909). The dye can be directly applied to cotton and requires no mordant or chemical to fuse the dye to the fibre. The literature pertaining to *purpura* focuses on Oaxaca, Mexico.

To obtain the dye from one *purpura* shellfish, it is removed from the rocks and gently blown on to cause it to emit the dyestuff and then returned to the rock, the dyer making sure it reattaches itself (Nuttall, 1909). The process irritates the *purpura* but it is not fatal and repositioning the *purpura* allows it to recover (Nuttall). Only shellfish over a certain size are milked so as not to hinder the ability of immature shellfish to produce the dye (Madrid, 1994). Carlsen and Wenger's (1991) article is the only source that states definitely that *purpura* was used in Guatemala prior to 1945. In San Juan La Laguna, natural dyers in the *artesania* had no knowledge of this dyestuff.

The absence of *palo amarillo*, logwood, cochineal and *purpura* in the dye palette of the Artesania Peréz is interesting. In the case of cochineal, it was the cost that precipitated the discontinuance of the dyeing practice by the *artesania* dyers. It is possible that these dyes were never used in San Juan or that *palo amarillo*, logwood, cochineal and *purpura* were used in the past but the dyeing practices were abandoned. Another possibility is that the dyers had no need to use these dyestuffs as they duplicated colours already available in their palette. However, I can only speculate on the reasons that p*alo amarillo*, logwood, brazilwood and *purpura* are not used to produce natural dyes in San Juan La Laguna. There is insufficient information to compare the San Juan natural dye inventory presented in this chapter with an inventory of an earlier time period or another area.

Discussion

The inventory of natural dyes presented in this chapter contributes to the published Guatemalan natural dye literature in a number of ways. First, it represents the first inventory of natural dyes used in San Juan La Laguna. It differs from other inventories discussed above as it focuses specifically on one village and the processes of natural dyeing by one group.

Secondly, it contributes to building a comprehensive inventory of natural dyes used in Guatemala. There are twelve dyes that are used in San Juan that were not mentioned by Carlsen and Wenger (1991), O'Neale (1945) or Osborne (1965). The Artesania Peréz used only six dyes noted in the published literature. However, there are five Guatemalan natural dyes that the Artesania Peréz does not use, three of which the dyers were unfamiliar with. The differences between the published literature and the San Juan natural dye inventory may be a function of time and location (see Chapter Five for further discussion). However, lack of specific information in the literature makes it difficult to speculate on the differences between the natural dyes used in San Juan La Laguna compared to those noted by authors (Carlsen and Wenger; O'Neale; Osborne; Reiche, 1999) as being used in Guatemala.

The final significance of this inventory is the way in which it was compiled and presented. Carlsen and Wenger (1991) note that "much of what is in print about the dyes used in Guatemalan textiles (is) a few facts, and a bit of fiction, all hung together with assumptions" (p. 366). This chapter presents the raw data on natural dyes that are, or were, being used by the *artesania*. I compiled this inventory by participating in the production of thirteen dyes and discussion with all of the natural dyers in the *artesania*. The compilation of this inventory provided a departure point for my investigations into the social and physical environment as related to natural dye production and use, the results of which are given below.

Chapter Six: The Physical Environment

Introduction

This chapter is divided into three sections. The first section is a description of the issue of land in Guatemala and the state of the physical environment. This description provides the physical context for *artesania* activities relating to natural dyes. The second is a description of the processes necessary for the Artesania Peréz to obtain dyes and the third is an assessment of the influence of these practices on the physical environment. This chapter includes information about the harvesting of dyes (those that I was able to observe) and dye disposal practices. The preparation and use of natural dyes are discussed briefly, as relevant to the physical environment.

The focus of the chapter is local resource management strategies that are used by the *artesania* or individuals in their employ. To this end I will restrict the discussion to dyes harvested from *ilamo*, *encino*, *nance* and *flor de muertos* as these are the dyestuffs that I was able to observe and which were not purchased on the market by *artesania* dyers. The social arrangements relating to natural dye harvesting, collection and use are discussed in Chapter Seven.

Landlessness, Poverty and Pressures

In order to examine the relationship between the *artesania* and their physical environment, it is necessary to begin with a brief discussion of the issue of land, or more appropriately in the case of the Artesania Peréz, landlessness in Guatemala. Wearne (1994) points out that uneven land distribution, favouring the elite, is at the root of poverty in Guatemala. The pressures of poverty on Juaneros are a part of the context of this research,

rather than the focus, but it is necessary to illustrate the pressures on land to provide clarity for investigations into the relationships between the social and physical environments.

"*Los juaneros que viven... en tierras que fueron de sus antepasados directos, pero que ahora son propiedad de sus vecinos de San Pedro a quienes deben pagar una renta para tener derecho al uso y a los frutos de tales tierras*" [The people of San Juan that live... on the land of their direct ancestors, but that is now the property of their neighbors in San Pedro, must pay a rent to have the right to use and to harvest the fruits of this land] (Seminario de Integracion Social Guatemalteca, 1968, p. 310). The landlessness of *artesania* members is not uncommon for Indigenous populations in Guatemala as illustrated by the on-going repatriation of refugees[35] from *La Violencia*. Generally, however, it seems that the loss of land has been an on-going part of various political programs rather than an event (see below).

In 1988, it was estimated that "some 98 per cent of indigenous families were landless or did not own sufficient land to support themselves" (Wearne, 1994, p. 13). This estimation is supported by two prominent trends of the late twentieth century in Guatemalan land ownership (Southgate and Bastrerrechea, 1992; Wearne). First, land is becoming concentrated into the hands of a few larger-scale export producers (Wearne). Secondly, smaller units of land are being broken down even further (Southgate and Bastrerrechea). There are numerous factors effecting these trends (see Southgate and Bastrerrechea; Wearne) although I confine my discussion to social factors including Mayan land distribution patterns and the confiscation of Indigenous lands.

It is common practice by indigenous Mayans, once they reach the age where they are no longer able to work their land, to divide it amongst their descendants (Nash, 1970). Nash (1970) states that for the M'am, an indigenous Mayan group centred around Xela, "the

[35] See Footnote 6

father... gives equal shares of his land and animals to each of his children, male and female" (p. 103). The equality of shares depends on factors such as the number of children, how much land there is to be divided and how much land the marriage partners bring to the union. The relevance of Mayan patterns of land distribution is indirect as Juaneros no longer own land. However, the proximity of San Pedro La Laguna, San Pablo La Laguna and Santa Clara La Laguna (see Figure 2) influences the pressures on land surrounding San Juan.

The indigenous land crisis is compounded by demographic considerations, i.e., the socio-economic value associated with having many children. It is important to have a number of children as they represent a source of labour (Barrios, 1997; Black, 1988; Nash, 1970) and security for their parent's old age (Nash). In San Juan, four children was the average number for *artesania* members and a third of the members had between nine and sixteen children.

The confiscation of lands during *La Violencia* was noted in the second chapter. This was simply one within a series of acts under a larger political program of "a massive assault upon village lands" (McCreey in Carlsen, 1997, p. 116) instituted by the Spanish and continued by the majority of subsequent Guatemalan political leaders. The confiscation of lands was legitimized through governmental proclamations, for example "Decree 170 (1877)... allowed former communal land to be privatized" (p. 116). In Santiago Atitlán the best lands were taken from indigenous Mayans and sold to coffee fincas or farms (Carlsen, 1997). Although Juaneros had no, or little, land to lose to the military, their neighbours' loss of land and the close proximity of villages had the effect of increasing the competition for cultivable land in the Lake Atitlán area.

The fact that the majority of the Guatemalan population, ninety-eight percent, owns less than two percent of the land[36] is a major concern for indigenous Mayans. "No wonder then that the Guatemalan Bishops started their Joint Pastoral Letter, *The Cry for Land* (published February 1988) with: 'The cry for land is without any doubt the loudest, most insistent and most desperate cry to be heard in Guatemala" (Wearne, 1994, p. 13). Options for food, or cash crop, production are few and include the increasing cultivation through the use of fertilizers and the farming of marginal or fragile land (Barry, 1992). Arnold (1995) notes that the "clearance of land for agriculture and pasture reduces the extent of the resource, distances users from remaining supplies, and is likely to result in more intensive use of what remains" (p.112). The issue of land and increased cultivation is an important consideration with respect to natural dye resources.

Denevan (1989) notes that approximately eighty-seven percent of land in Latin America is fragile; the figure is higher for Guatemala. Fragile lands are those biophysical components of an ecosystem that may be subject to deterioration under use systems. According to Barry (1992) and Southgate and Basterrechea (1992), these fragile lands have already undergone deterioration to some extent. Thirty-five percent of Guatemalan soil is seriously eroded and a further thirty percent is at high risk of erosion (Barry). Soil erosion forces people onto marginalized lands or to intensify production on already over-worked lands to meet needs of growing population (World Commission on Environment and Development [WCED], 1987). In turn, this further deteriorates the soils.

The rate of soil erosion is directly influenced by the rate of deforestation. Deforestation is occurring in Guatemala at a rapid rate (Barry, 1992; Southgate & Basterrechea, 1992). It is predicted in the literature (Barry; Mutchnik and McCarthy, 1997),

[36] This figure is for the total land in Guatemala. I could not find any references to total area of cultivable land.

based on the consistency of current rates of deforestation, that Guatemala will have no forest cover left by the year 2032, at the latest. Firewood directly accounts for over one quarter of deforestation as three out of four people rely on it for cooking (Barry). Trees that under normal circumstances would not be used, are taken for fuel (Southgate & Basterrechea). The *artesania* buys wood from a local merchant who sells to them once a year. Smaller scale vendors of firewood went into the mountains during the morning and returned with cut wood at night. This suggests the likelihood that trees used for firewood are from the immediate area. The overall degradation and fragility of the Guatemalan environment make the resource management strategies (Vivian, 1995) important.

The fragility of land around San Juan is illustrated by a mudslide that occurred during my residence in San Juan. Figure 8 is a picture of the mudslide. It shows the area directly to the north of San Juan La Laguna and provides a clear view of the slide. The intensity of cultivation around San Juan La Laguna (see Figure 8) and the resulting soil erosion creates a dangerous situation for dye collectors, and other people travelling in the mountains. During the rainy season, two men caused, and were killed by, the mudslide. A number of Juaneros commented that the men knew the dangers but still went because they had to feed their families and there was no other alternative.

Harvesting of Bark Dyes

In late November the president decided that the rains were no longer a threat and arranged for me to go with her son-in-law, employed by the *artesania* to collect dyes and his sister, a natural dyer in the *artesania* and my interpreter. These arrangements resolved the issues of safety and propriety. The men usually collect dyes over a period of two or three days, staying outside of the village the whole time, but this was considered too dangerous for

Figure 8 A View of the Mudslide to the North of San Juan La Laguna

(Photo Credit: C. Davis)

me[37]. It was decided by the three of us that we would harvest from natural dye resources close to the village, in a series of day trips.

The closest dye trees used by the artesania were a half-day's walk into the mountains (see Figure 9). Each day that we[38] went to collect dyes the three of us set off prior to sunrise from San Juan La Laguna. The first day we went to collect *ilamo* and *encino*. Instead of walking for four hours uphill we took a bus to Santa Clara La Laguna and walked for two hours to reach the collection sites, near an *aldea* of San Juan La Laguna called Palestina. The object of our second trip was *nance* and for this we walked to the south for 45 minutes up the lower slope of Volcán San Pedro. Each of us carried a small pack. In my pack I carried a video and still camera while the others carried nothing with the exception of a machete.

A machete was the only tool that the dye collector used to harvest tree bark. He used the following procedure on four *encino* and seven *ilamo* trees. First, he made a horizontal notch in the tree at the desired location about a quarter to a third of the diameter of the tree. Two vertical cuts were then made at either end of the first horizontal notch. The depth of the cuts he made was equivalent to the thickness of the bark. He then inserted the machete into the vertical cut and pried the bark from the tree (see Figure 10).

Bark removal from the sole *nance* differed from *encino* and *ilamo* as the bark of the latter two are more flexible. As *nance* bark is thinner and therefore more difficult to remove, he used the machete like an axe to remove the bark in small chips. After each cut he and his sister were careful to collect every piece of bark that had been taken from the tree. Forest

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[37] My personal safety was not a concern when I stayed within the villages of San Juan La Laguna or San Pedro La Laguna. My host family was, by all accounts, respected within the community and as an adopted member of the household this respect extended to me. However, outside of the village boundaries my safety was not guaranteed.

[38] 'We' in this section refers to myself, a man commissioned by the *artesania* to harvest dyes and our chaperone (my interpreter, his sister and a natural dyer in the *artesania*).

Figure 9 Location of Dye Plant and Trees in the Area of San Juan La Laguna (After Dirección General de Cartografía, 1960)

Figure 10 Dye Harvester Using a Machete to Remove *llamo* Bark

(Photo Credit: C. Davis)

cover made collecting the pieces difficult but they sorted through areas where bark was seen to fly and made certain that everything was put into the bag.

The amount taken from each of the three trees differed according to the species of tree, the thickness of the bark and general condition of the tree. A piece of bark the size of a grown man's hand[39], about a pound, was taken from *ilamo*. The dye collector said that *encino* was more resistant than *ilamo* and this was why he took a piece of bark twice the size of what he took from *ilamo*. He removed only a pound of bark from *nance*, even though he stated that the tree is extremely resistant and quick to recover, as bark had been removed recently by unknown persons.

In the cases of *ilamo* and *encino*, bark was taken directly from the trunk of the tree. In all of the cases, the area of removal was below a metre high and in a direction away from the sun. Three of the *ilamo* trees that we harvested had been used 6 months prior to our activities. Bark was taken from a site ¼ turn clockwise and higher up from the previous removal sites. The bark on the trunk of the sole *nance* tree was spotty and the harvester decided to climb the tree to remove bark from the branches.

During the harvesting of dyes, the collector used his machete to take off branches or cut plants and shrubs around trees. Engaging in tree maintenance, he said, was important to do while harvesting dyestuffs and he illustrated his point by using his machete to sever a dead branch. He explained that the branch was inhibiting small branches from growing and that the removal of this branch would allow the smaller ones to get more nourishment from the tree. He carried the branch home and removed the bark to be used as dye and the rest for firewood.

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[39] The dye harvester used his hand as the standard of measurement for bark removal.

Collection of plants

Flor de muertos is the only plant that I participated in collecting and I will restrict my discussion to this dyestuff. One natural dyer in the *artesania* collects the flowers for the artesania in October and November. We walked along the road to San Pablo (see Figure 9) and collected flowers growing wild by the side of the road. Along the road, in many fields lying fallow in the area, *flor de muertos* grew abundantly, even sprouting from rocky outcroppings lining the mountain side of the road.

A natural dyer from the *artesania* and myself walked about 4.5 kilometres, taking about half of the flower heads from any given area that were within easy reach from the roadway. The dyer specifically cautioned me not to take all of the flowers from one stem or in one area because they would not return next year if we took them all. The seeds of the plant are attached to the petals. Our collection netted five pounds of flower petals and I was surprised when the president stated that it would not be enough and the dyebath was augmented with flowers that she purchased in the market of Sololá.

Preparation and Use of Dyestuffs

As noted previously, I will not describe in detail the process used by the *artesania* dyers to make and use the dyestuffs. The *artesania* wants to maintain the secrecy of these processes to ensure that other weaving co-operatives located around Lake Atitlán do not encroach on their market niche. In this section I will simply make note of factors that effect the physical environment.

Leaves, barks and branches from trees, whole plants and vegetables used as dyestuffs are strained prior to dyeing yarns. Yarn is boiled in water for a period of time prior to dyeing. The amount of yarn dyed at one time is determined by the natural dyer based on the type of

dyestuff, the amount of yarn needed for specific patterns and the desired intensity of the colour. This requires large amounts of wood for fuel. Dyeing once a week for three months, the *artesania* used a pile of wood approximately seventy-five centimetres wide, two metres high and three metres long.

During different dyeing occasions, *artesania* dyers stated that they required a mordant to fix the dyes. They added a small amount of *cal* (Calcium Oxide 6.1%) powder to the first indigo dyebath that I observed. In the cases of the dyebaths made with *flor de muertos* and a mixture containing *rosa jamaica* and beets, the dyers added from a tablespoon to a half cup of salt. The amounts that they used were small (see Dalby, 1993) and both salt and *cal* are used daily in the household. Salt is a seasoning and *cal* is used to clean *nixtamal* or grains of corn that are ground for tortillas.

The fact that it was unnecessary to add a mordant to the majority of the dyebaths may be due to fixing properties of the dyestuffs themselves. Dalby (1993) notes that tannin, a natural fixative, can be found in a variety of tree products including bark and seeds. It is possible that the tree dyestuffs, such as pomegranate, *achiote*, *injerto* and *zapote*, used by the *artesania*, contain sufficient quantities of tannin to negate the need for the addition of a chemical mordant. However, the mordanting properties of these dyestuffs need to be researched further.

Following the dye process, the yarns are washed. In every instance that I observed natural dyeing, after the yarns were dyed they were taken to a stone wash basin. Although the yarns were steaming, the natural dyers stated that it was important not to let them dry at this stage. Using cold water, the dyers would rinse the yarns and knead them, repeating the

process until the water ran clear. Waste water from the wash basin used by the *artesania* is piped into a neighbouring coffee patch[40].

Disposal

The process for disposal of the materials left over from natural dyeing, in the case of the Artesania Peréz, refers only to exhausted dyestuffs. Concern for the dumping of dyebaths (Dalby, 1993) is unwarranted in this case as once the dyer considers it exhausted, it becomes the base for subsequent dyebaths. Dye leftovers[41] produced during the preparation stage include seed pods from *achiote*, the white centre of the coconut and shells from *injerto* seeds. The process for disposal differed slightly for barks, fruits and plants.

After colouring material was extracted from the bark of *nance*, *ilamo* and *encino*, *artesania* dyers would deposit the leftovers into a basket. A natural dyer placed the basket in the sun to dry the bark. The dried bark was then used as fuel. Material from plants, including *chilca*, *cola de leon*, *flor de muerto* and *rosa jamaica*, were composted by *artesania* dyers. The centre of the coconut, left over from the dyeing process, was consumed and other vegetable matter, namely beets and pomegranate, that had not been ground could be fed to animals depending on the condition.

The composting of organic materials was not simply a reality in San Juan La Laguna, a village without landfills or garbage removal. Organic 'waste' was usually turned into the cornfields, home gardens or larger vegetable plots. Inorganic waste, the majority of which was composed of plastics, was thrown into coffee patches. I asked a number of Juaneros why coffee patches were covered with plastic garbage while the *milpas* were clean. Based on their

[40] Dye water was piped into the coffee patch as this was directly behind the wash basins, slightly downhill and a place for waste.
[41] This term is more appropriate than dye waste because nothing from the process is wasted or viewed as waste, by the natural dyers.

responses, the following considerations are important: plastic products are produced externally, coffee is an export product[42], corn is consumed locally and organic waste is produced locally. It follows, therefore, that as organic waste is fertilizer for cornfields so plastic products provide fodder for coffee plants.

Discussion: Defining and Determining the Sustainability of Natural Dye Harvesting

There is little in the way of published literature that is concerned with the sustainability of NWFP harvesting (Gould et al., 1998; Hall and Bawa, 1993; IECNWFP, 1995). Godoy et al. (1993) divide publications into three categories: those that "say that indigenous people manage non-timber tropical forest products sustainably; others say that they do not, and a third camp says that sustainability is the result of special conditions that must be identified in each case" (p. 228). The following are examples of: the unsustainability of natural dye harvesting by indigenous peoples in general, the (un)sustainability of natural dyes by a specific group in Guatemala and the sustainability of forest and plant use practices by an indigenous group in Guatemala.

The "Report of the International Expert Consultation on Non-Wood Forest Products" (IECNWFP, 1995) states that

> since the volume for individual NFWP is in most cases small, the attention devoted to their harvesting also tends to be less. The collectors are mostly unskilled and untrained in scientific methods. As a result the harvesting standard of many NWFPs are poor and rudimentary, and hence wasteful, destructive and unsustainable... There are variations in the system of organizing NWFP harvest. One common system is collection by local people under rights bestowed, for sale in the local market, or with some form of patronage and financial help from the purchasing agent. Another is by the employment of casual or contract labour by those who have

[42] Coffee is consumed locally. However, an analysis of local categories of flora is necessary to explain this inconsistency.

> obtained collection rights on lease. The collectors of NWFPs are often exploited by middlemen who control access to the market, or by those who control access to the resource. Thus the millions of NWFP collectors have no adequate incentive for practicing properly controlled and sustainable harvesting. Post-harvest care is also poor in most cases, and wastages are high (p. 18).

The use of the word 'expert' in the title of the publication seems to reflect a biased standpoint of the IECNWFP. The list of participants included directors, professors and doctors from various educational, research and governmental organizations but did not include any community representatives.

Godoy and Bawa (1993) state that "sustainability can only be determined by directly measuring the rate of extraction and comparing it to the rate of natural replacement" (p. 216). Sustainability as presented by Godoy and Bawa is more appropriately, for this research, called sustainable use. This refers "specifically to the use of natural resources within their capacity for renewal" (Newton, n.d, p. 1). This definition of sustainability was the basis for the study that Gould et al. (1998) conducted on the sustainability of natural dye extraction in Petén, Guatemala (see Figure 1) by the project Conservation International. A major assumption of the study was that "in (the) short term, harvesting does not stimulate regeneration or growth, and, therefore is essentially mining" (Gould et al, p. 75). By approximating the number of trees in an area, through forest inventories, and comparing the inventory with demands for the products, Gould et al. found that the extraction of dyes from logwood and *mora* is unsustainable while *saltemuche* is not threatened.

Atran et al. (1999) compared three cultural groups residing in Petén and found that the Itzaj from San José (see Figure 1), a Mayan and only group indigenous to the area, "reveal systematic awareness of ecological complexity involving animals, plants, and people and practices clearly favoring forest regeneration" (p. 7598). Although Atran et al. are not

concerned with the quantification of the sustainability of the agroforestry practices of the three groups, they do state that "Itzaj practices encourage a better balance between human productivity and forest maintenance" (p. 7600) than do immigrant Q'eqchi and Ladino populations. The basis of Atran et al.'s discussion was behavioural surveys of each group's agroforestry practices, which were then corroborated by physical measurements of trees counts and species diversity.

The range of sustainability presented by the three cases is interesting in light of the following statement by Godoy and Bawa (1993): "The assumption of sustainability often rests on indirect, anecdotal evidence about quantities of animals and plants culled from the forest by indigenous populations. Scholars assume that because indigenous people have harvested a product for a long time, harvesting must be sustainable" (p. 216). Atran et al.'s (1999) study, which included discussions with research participants, illustrates the sustainability of an indigenous Mayan community's forest use practices. In the case of IECNWFP (1995) and Gould et al. (1999), it is the authors who are defining sustainability and determining the sustainability of harvesting of NWFPs, not the indigenous producer or user group(s). The degree of sustainability presented in these cases seems to be linked to the degree of indigenous participation in the studies[43] and the definition of sustainability.

My research is similar to those described above, in that a goal of the research is to determine the sustainability of the use of a NWFP. However, this work differs because the basis of defining and determining the sustainability of natural dye production and use was the indigenous knowledge, as an "integrated system of knowledge, beliefs and perceptions" (Berkes, 1993, p. 5), of the natural dyers and harvesters within the Artesania Peréz (see

[43] See Dixon and Fallon (1989) for further discussion on the meaning of sustainability for different groups

below). An assessment of the sustainability of natural dye production according to the perceptions of the research participants is justified by the theoretical approach (see Chapter Three). This assessment is based on the assumptions that "those who live on the land and harvest its resources have an intimate knowledge of the distribution of resources, the functioning of ecosystems, and the relationship between their environment and their culture" (Stevenson, 1996, p. 278) and that the participants acting in a social world are able to reflect upon themselves and their actions (Hammersley and Atkinson, 1995).

The Sustainability of Natural Dye Harvesting as Practiced by the Artesania Peréz

The above description of harvesting and use practices of natural dyes is a description of resource management strategies employed by dye collectors working for the Artesania Peréz. Authors refer to these systems as resource management systems (Alcorn, 1981), natural resource management systems (DeWalt, 1994), traditional harvesting (Gould et al., 1998) and traditional ecological knowledge/other traditional knowledge (Stevenson, 1996). The use of the word 'traditional' to describe this knowledge is misleading, a fact discussed by a number of authors (Berkes, 1993; Stevenson; Vivian, 1995). The length of operating time of these systems varies from months to millennia. 'Traditional' resource management systems are dynamic and based on current needs and have their roots in local historical strategies (Alcorn, 1984; Slikkerveer and Dechering, 1995; Stevenson).

The goal of resource management strategies is ensuring resource sustainability (Fernández, 1994; Hall and Bawa, 1993; IECNWFP, 1995; Peters, 1996; Vivian, 1995). As illustrated above the "definitions of sustainability range from fairly narrow and precise ones to a broader more nebulous concept" (Dixon and Fallon, 1989, p. 73). The meaning of

'sustainability' depends on the user (Dixon and Fallon) and, as discussed above, the definition depends on the perceptions of research participants. In the words of the dye harvester that I accompanied on dye trips: "we must take care of these trees, feed them and keep them healthy because then they will feed us and our children and help us when we need it". This is in line with the WCED (1987) definition of sustainable development meeting "the needs of the present without compromising the ability of future generations to meet their own needs" (p. 8).

The three major concerns of IECNWFP (1995) with reference to the unsustainable practices of NWFP harvesters, namely unskilled labour, middlemen and wastage, coincide with those aspects that research participants included as important to the survival of the trees. I will discuss the views of research participants alongside the relevant published literature concerning the sustainability of harvesting natural dyes. First, this serves to locate my findings within a larger body of published literature. Second, this comparison will illustrate misconceptions concerning indigenous knowledge (see Chapter Three) and the importance of considering this knowledge holistically.

The concern with a lack of scientific training on part of collectors may be unjustified in light of the fact that "many of these indigenous silvicultural systems are quite sophisticated and, not surprisingly, are comprised of many of the same operations routinely employed by trained foresters" (Reis, 1995, p. 261). The invisibility or underplaying of these systems may be due to the fact that they usually are not formalized in any way and may appear haphazard or casual (Peters, 1996). Peters notes that there are seven aspects of silvicultural management that are important to sustainable use of resources including: harvesting[44], refinement, thinning, liberation, selective weeding, diagnostic sampling and enrichment planting.

[44] Harvesting in this context relates to removal of whole trees.

The *artesania* dye collectors practice at least three of the aspects of silviculture management that Peters (1996) discusses. The removal of the *nance* branch, described above, is part of refinement or removing dead material to promote further growth (Peters). I did not observe the *artesania* collectors practice liberation which is the removal of unwanted neighbouring competitors (Peters). However, one *artesania* dye harvester stated that in the forested area that belongs to his father he "strangles the unwanted trees" by removing large portions of bark around the whole diameter of the tree. Finally, selective weeding or the removal of unwanted undergrowth that may compete with the trees (Peters) occurred during our approaches to the dye trees and collection when the dye harvester used his machete to remove undergrowth.

The dye harvester that I accompanied on the dye trips and interviewed on a number of occasions explained that his knowledge of plants and trees derived from a number of sources. Accompanying his father and grandfather as a young man, he said, was the most important source of his knowledge as they taught him about the local species and their properties. I observed him one day taking pieces of bark from a tree located in our common courtyard and asked him why he was doing this. He replied that the tree had to be brought down and he wanted to learn about how much bark could be taken from the tree before it would die. Experimenting with trees that were considered superfluous added to his knowledge. He considered killing this tree as a non-detrimental activity as it would be removed in any case. He had attended one year of university studying agriculture and he stated that he worked with NGOs, such as the Asociación Nacional del Café en Guatemala [National Association of Coffee in Guatemala], collecting environmental data.

The educational background of the dye collector related to dyestuffs, trees and plants reflects indigenous knowledge as being holistic, continually developed, refined and

transmitted (Vivian, 1995). The sources of his knowledge are not restricted to the local or traditional (see Stevenson, 1996) but include formal, informal and experiential methods of learning. Atran et al. (1999) describe this diffuse learning network as part of the permeability of the boundaries of learning. The dye collector states that it is important to learn new things and he incorporates useful knowledge into his knowledge base. He also said that he "could not wait until [his] son is old enough to accompany [him] into the mountains where [he] will teach his son what [he] has learned about the plants and trees".

Based on my observations, the harvesting standards of the men commissioned by the *artesania*, promote sustainable use rather than encouraging deforestation. Peters (1996) notes that removal of vegetative structures, meaning stem fibres, leaves, roots and barks, will either kill the tree outright or, if sustainable, encourage regeneration. The calculations that the dye harvester stated he makes for each tree, based on the species, thickness of the tree, previous use and condition, are to "ensure that the tree does not die". Harvesting dyestuffs in the morning and ideally during the periods of transition from rainy to dry seasons, encourages the retention of moisture that may be critical to the regeneration process. Further, moisture is retained by removing bark outside of the path of direct sunlight.

Peters (1996) notes that the use of barks may lead to the death of the resource. In Mexico the popularity of bark handicrafts was accompanied by an increase in the intensity of bark removal which ultimately led to the death of the trees (Peters). Rather than rely on one single tree or grove of trees, the *artesania* dye harvesters make exploration for new sources part of their excursions for harvesting dyes. One harvester stated that "in one trip that takes three days we may take one day just to look around and find new trees so that we can use those". He also stated that they may return to trees that they had removed bark from

previously. In the case of *ilamo, encino* and *nance*, they would take bark only if the previous cuts had healed and then in a different location on the tree.

The removal of fruits, nuts or seeds, the reproductive propagules, eventually results in fewer established seedlings (Peters, 1996) which means fewer potential resources. A lengthy period of time may be necessary to notice this inevitable contraction of resources. This may be one reason why, according to natural dyers and landowners, *flor de muertos* is as abundant as it was from twenty to fifty years ago. This is curious in light of the fact that large amounts are used for ceremonial purposes by all of the inhabitants around Lake Atitlán and many are growing on land that lies fallow only for a period of time. The amount that the natural dyer and I collected was controlled in that we did not clear an area of the flowers or a single plant of all of its seeds. It seems that the loss of one growth area is offset by the gain of another as landowners rotate their land cultivation.

The IECNWFP (1995) claim that NWFP harvesters have no incentive[45] to practice sustainable harvesting is erroneous in the case of the dye collectors employed by the Artesania Peréz. The dye collectors are casual labourers but they do have a stake in ensuring the survival of these trees. In monetary terms, as long as there are dyestuffs in the mountains surrounding San Juan La Laguna and the *artesania* continues to use the dyes, the dye harvesters will have long-term employment. He sees his future and that of his family as

[45] In this statement I read incentive to be short-term monetary incentives. It denies the possibility that trees and plants may have aesthetic or spiritual value to the users. For example, *flor de muertos* is a funerary offering as well as a natural dye. Further reasons for the sustainable practices of *artesania* harvesters may be discovered in those 'intangible', or not readily accessible to outsiders (Vivian, 1995), aspects of indigenous knowledge. These are evident in: Stevenson's (1996) use of the term 'other traditional knowledge' (see Figure 3), Westney's (1988) macro/microenvironments (see Figure 5) and Steiner's (1995) discursive conscious, practical consciousness and the unconscious (Figure 7) and Berkes (1993) beliefs and perceptions. Intangible aspects of knowledge include the cultural, moral and spiritual aspects which may influence individual behaviour in interacting with the natural environment (Stevenson, 1996). However, the cultural and spiritual roles of natural dyestuffs are beyond the scope of this research.

dependent upon the resources that he collects for the *artesania* even though he does not own the resources.

Waste produced by harvesting was not evident in the case of the dye collectors. The simple fact is that the *artesania* cannot afford to waste anything. The scarcity of resources in the immediate area makes dye collectors careful. I watched as *nance* chips were scattered from the harvesting procedure and as the dye collectors searched through leaves and undergrowth to ensure that they collected every piece. The uses of exhausted bark as firewood or compost are examples of recycling and reusing material rather than wasting.

Local resource management strategies used by the *artesania* dye harvesters are sustainable, according to the definition and determination of the sustainability of natural dye use by research participants. This is notable in light of arguments that economic circumstances and unequal land distribution are among the principal causes of unsustainable resource management (Hardin, 1968; IENCNWFP, 1995; Katz, 2000). Juaneros are landless, eighty-nine percent live in extreme poverty (Wearne, 1994) and have few economic opportunities[46]. However, the dye harvesters do not over-exploit natural dyes. The discrepancy between the sustainable practices of the dye harvesters and the pressures encouraging the over-exploitation of natural dye plants and trees, is explained through a consideration of the social environment in which natural dyeing practices occur. My research supports Katz' argument that "social capital should be treated on par with property rights as a determinant of natural resource management practices" (p. 129). The roles of social capital, including relationships, knowledge and knowledge pathways (access), relative to natural dyes will be dealt with further in the following chapter.

[46] The slide described above is illustrative of grinding poverty experienced in San Juan La Laguna. The men knew the risks involved but were compelled to ignore them through necessity to feed their families.

Chapter Seven: Social Environment

Introduction

Textile production, including natural dye activities, is a survival strategy for Juaneras that fits within social and cultural norms in Guatemala (Ehlers, 1990). However, social relations do not exist in a cultural vacuum and "as conditions and patterns change... so may attendant behaviours" (Ehlers, 1991, p. 4). Economic necessity (Ehlers, 1990), political and social circumstances (Wearne, 1994) and the continually changing state of the physical environment are among the conditions that influence the organization of the *artesania* and the relations surrounding natural dyeing.

The main objective of this chapter is to describe the social relations that surround the procurement, production and use of natural dyes by the Artesania Peréz and locate these specific relationships within the context of general social relations. All of the relationships described below involve some form of economic exchange, i.e., money for goods or labour[47]. However, an assumption is made that the economic is 'embedded' in the social as "behaviour and institutions to be analyzed are so constrained by ongoing social relations that to construe them as independent is a grievous misunderstanding" (Granovetter, 1985, p. 482). In order to locate natural dyeing relations within the context of general social relations, I will compare them with views of indigenous Mayan households as the household provides the pattern for other social relations (Hill and Monaghan, 1987; Nash, 1970).

Social relationships are a resource (Alcorn, 1981) utilized by the *artesania* to engage in natural dyeing in place of economic and natural capital. The president said that they "could not use dyes without these people [referring to natural dyers, harvesters and tree

[47] As noted previously (see Chapter Two), an economic analysis of natural dye production and use is beyond the scope of this research but economics are mentioned when necessary as background.

owners] because we do not own land on which to grow our own dyes". These valuable relationships are part of the *artesania*'s social capital, which is defined by Coleman (1990) as "the value of those aspects of the social structure to actors, as resources that can be used by the actors to realize their interests" (p. 305). The secondary objective of this chapter is to determine and describe various aspects of the social capital of the Artesania Peréz.

Organization of the Artesania Peréz

The organization of the *artesania* is hierarchical with a board of directors and general membership. The board is composed of a president, vice-president, secretary, treasurer and two speakers. According to the written acts[48] of the Artesania Peréz, the president is democratically elected by members present at a meeting set aside for this purpose. The current president has held her position from the inception of the *artesania* although only one election is noted in the acts since 1990.

The president stated that the board members are also elected by the general membership on a yearly basis. However, there is no mention of an election for any of the board positions and the women that I spoke to, who were not members of the board, had no idea as to how the board was selected. Based on the acts, at least two of the president's immediate family fill at least two positions at any given time. The president of the *artesania* described the position of treasurer as the person who takes care of the money, the secretary as the note taker at meetings and the vice-president as the assistant to the president. I observed the secretary taking notes but the president handled all of the finances, both incoming and outgoing, including product sales and wage payment. The vice-president answered to the president's requests. The structure is hierarchical with the president holding the most power.

[48] The acts are minutes of the *artesania* meetings.

There is a well-defined division of labour within the *artesania*. Four women are employed to set the textile warps in spite of the fact that all of the weavers have this skill. There are two seamstresses, one who stitches the panels together and one who embroiders designs on textiles. *Jaspé*[49] is produced by two natural dyers. The president determines the colour combinations, designs of the textiles, distributes the yarns and decides which designs each woman will work on. The rest of the women in the *artesania* weave using their own backstrap looms.

A Description of Social Relations Relating to Natural Dyes

Resource management is often used in the published literature to describe strategies involving trees and plants. This definition is restrictive in this case as it ignores other resources, specifically relationships, necessary to obtain the dyes that are not readily available to a specific individual (Alcorn, 1981). Human resource management, or the ongoing maintenance of relationships to ensure materials (Alcorn, 1981) is critical to natural dye production by the *artesania*. The three categories of relationships that are important to natural dyeing activities as practiced within the *artesania* are those between *artesania* members and: (1) the owners of dye plants and trees, (2) male dye collectors and (3) natural dyers.

Owners of natural dye resources include those who are related to *artesania* members and those who are not. The owners of natural dyestuffs can be further broken down into fruit and vegetable merchants and people who have dyestuffs growing on their land. Dyestuffs

[49] *Ikat*. A form of resist dyeing on yarns to be woven.

that are also foodstuffs are purchased by the *artesania* in the markets of Sololá, Antigua, and Xela. These relationships are based on the exchange of money for goods[50].

People who were approached by *artesania* members in order to purchase dyestuffs differ from merchants. These people did not take part in any formalized markets, and usually lived in San Juan La Laguna or, in the case of the indigo bush owner, San Pedro La Laguna, and the *artesania* (rather than the owners) collected the dyestuffs. Tree owners were paid based on the amount that the dye collector said that he harvested or intended to harvest rather than the actual amount collected. Therefore, there is an aspect of trust in the tree owner's relationship with the dye harvesters, as *artesania* representatives.

In a strictly economic sense, the lack of monitoring the harvesting of natural dyestuffs on the part of tree owners appears irrational. The harvester may kill the tree or underestimate harvested amounts thus lowering the payment to the owners. However, the trust of the tree owners becomes clearer when considering the idea that economic actions are embedded in social relationships (Granovetter, 1985; Katz, 2000). Katz states that "the existence of social capital can have qualitative impacts on the nature of economic transactions. By mitigating information costs and moral hazard concerns, strong social relationships between trading partners can affect price, relative risk aversion and contract choice" (p. 116). The notion of social capital, expanded below, that is evident in relationships between the dye harvesters, and tree owners is extremely important to the investigation of natural dye production and use by the Artesania Peréz.

In the cases of *encino* and pomegranate, the *artesania*'s ability to obtain these dyes depended on kin relations. *Encino* bark was taken from the land of a natural dyer's father[51].

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[50] I was unable to observe any of these transactions. The president of the *artesania* did not want me near when purchasing dyestuffs as she said that prices were always higher for foreigners.

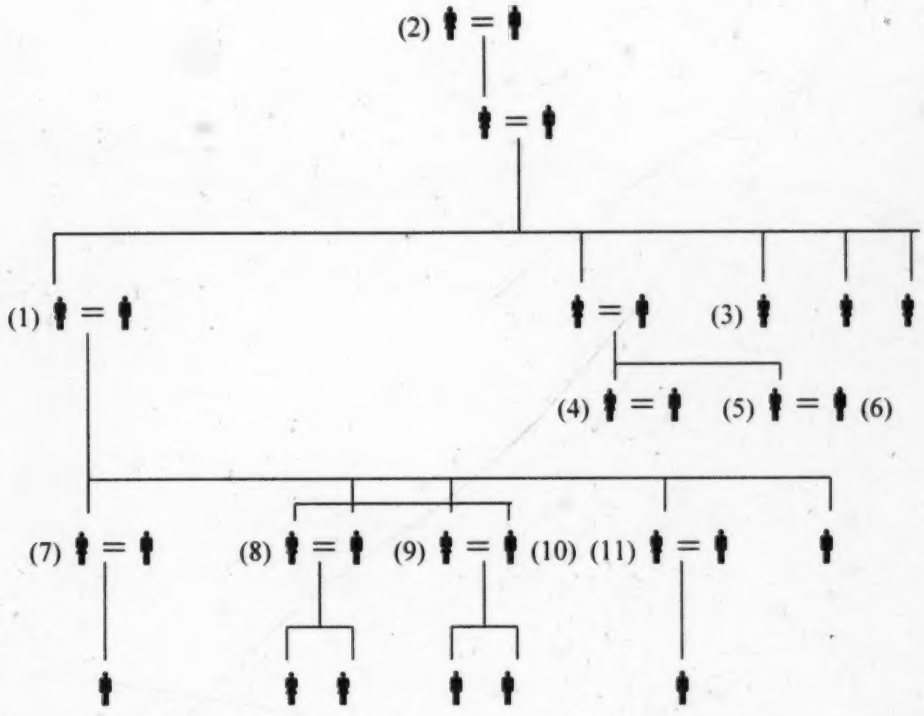
[51] I have stated previously that Juaneros are landless. He is from Santa Cruz del Quiché (see Figure 1) and married a Juanera.

He demanded no payment for his material as his wife, son, daughter and daughter-in-law are all employed by the *artesania*. Pomegranate was relatively scarce in San Juan La Laguna. The natural dyers stated that this was due to the length of the rainy season, i.e., a short growing year. Many of the fruits did not mature, thus there were few pomegranates in the markets of San Juan and San Pedro La Laguna. A natural dyer and I managed to acquire a number of fruits through extended family ties of *artesania* members.

The second type of social relationship important in obtaining natural dyes are those between *artesania* members and natural dye harvesters. As noted previously, the *artesania* commissions men to harvest dyes in the mountains around San Juan La Laguna. This was not always the case as two Juaneras, both natural dyers, described the occasions when they went into the mountains to collect dyes. The *artesania*'s practice of commissioning men began during the civil war at approximately the same time, circa 1980, as the president was detained by the army. However, natural dyers went into the mountains to collect dyes as late as 1996 but stated that they did not go after this and would not go again, due to the difficulties involved. The women stated that the dyestuffs were too far away, it was too dangerous and it was difficult to travel with their children.

The two men that harvest dyes in the mountains are a son-in-law of the president and the husband of one of her nieces (see Figure 11). The president stated that she had asked one man, unrelated to any *artesania* members but a tree owner, to harvest tree bark but he returned with useless bark and killed a number of his trees in the process. The natural dyers believe that it is better to employ the two men, referred to above, because they have knowledge of the dyes and can obtain them without threatening the resources and it means that the natural dyers do not have to go into the mountains. It is also apparent that commissioning male kin increases the president's control of dyeing knowledge by ensuring

Figure 11 Relationships of Natural Dyers and Harvesters in the Artesania Peréz



Legend

Female Male

(1) President of the Artesania, natural dyer, knows all of the dyeing processes and originating species of the dyestuffs and my host.

(2) Passed dye knowledge and processes directly to (1).

(3) Member of the *artesania*.

(4) Member of the *artesania*, knows approximately half of the dyeing processes and is able to produce jaspé.

(5) Member of the *artesania*, knows approximately half of the dyeing processes.

(6) Natural dye harvester.

(7) Secretary of the *artesania*.

(8) Vice-president of the *artesania*, knows how to produce all of the natural dyes and their originating species, able to jaspé, my translator and chaperone on natural dyeing trips.

(9) Member of the *artesania*.

(10) Brother of (8) and natural dye harvester that I accompanied into the mountains on a number of occasions.

(11) Member of the *artesania*.

that it remains within her sphere of power (see below). Although the men are not members of the *artesania*, they still have an interest in performing well as their families are affected by it through their wives.

There are four natural dyers in the *artesania*, the third type of social relationship relevant to the *artesania*'s natural dyeing activities. Two are familiar with all of the dyes and processes and the other two have knowledge of the processes required to make approximately half of the dyes. The president is concerned with the potential loss of dyeing knowledge and on more than one occasion she stated that if she died in the near future there would not be anyone to continue this 'tradition'. However, she does not want too many people to learn the process because it would increase the competition in *tejidos tipicas*[52]. The president told me of two other women, unrelated to any of the women in the *artesania*, that she taught to use natural dyes because they were interested. She stated that both women, after learning to use the dyes, left the *artesania* and the village to teach other groups of women how to use the dyes for payment. Thus, in her view, these women were increasing competition within the market for naturally dyed textiles and profiting from the use of her specialized knowledge.

The *artesania* utilizes a variety of relationships in order to engage in natural dyeing. These include kin relations, other people living in the immediate area of San Juan La Laguna, including the tree owners as members of the San Juan community and merchants in foodstuffs. These relations are critical because the *artesania* does not own land on which to grow natural dyes.

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[52] Traditional textiles.

The Artesania Peréz as a Household

In Mayan communities the household is the central structural unit that provides for survival and well-being (Ehlers, 1990; Méndez-Domínguez, 1983; Nash, 1970). Nash notes that "the bilaterally extended kinship group provides the pattern structuring relations throughout the community... and [that] these patterns [are] traced in other institutions" (p. 115). Hill and Monaghan (1987) note that, in Guatemalan highland communities, there is evidence that the precolonial *chinamit* survives in varying forms. The *chinamit* is best described as a Mayan social grouping "necessary to maintain the species through reproduction and food production... offer(ing) life-enhancing and life-preserving benefits" (Farriss, 1984, p. 138). The suggestion that larger social groupings in Guatemala simulate the household (Hill and Monaghan; Nash) provides a basis for the comparison of the *artesania* with the household. It also supports the claim that the *chinamit* has survived. Important aspects of the household, as defined by various authors and research participants, include the composition, goals of the unit, individual activities/responsibilities and power relations.

Méndez-Domínguez (1983) states that "the household of the Traditional Indian (in Guatemala) is composed almost exclusively of family members" (p. 230). A more precise definition of the household "is a crystallization at a given point in time of consanguineously and affinally related people within a wider kinship matrix" (Nash, 1970, p. 103). The majority of households in San Juan La Laguna consisted of a number of people of a variety of ages related by blood or marriage. In San Juan La Laguna a household is not necessarily limited to one house but refers to all of the members of a household compound[53] (see also

[53] A household compound generally consists of a number of houses or rooms facing a central courtyard. For example, the compound in which I resided consisted of three houses, occupied by three nuclear families, that faced a courtyard garden.

Nash). A compound is a collateral extension of households (Nash) and is described by Méndez-Domínguez as a structural simulation of the 'nuclear Guatemalan family'.

The membership of a household is usually a function of blood or extended kin relations, whether affinal or adopted (Méndez-Domínguez; 1983; Nash, 1970). It is possible that many of the *artesania* members residing in San Juan La Laguna are distantly related[54] based on the fact that the majority of people marry within their village[55]. The composition and size of the *artesania* changes just as families do due to life cycles (Méndez-Domínguez; Nash). Marriages, death and employment migration all affect household membership in the same ways as the *artesania* is affected.

Households provide for economic cooperation, socialization of the young (Nash, 1970), physical protection and access to labour supply (Bossen, 1984). Women in San Juan La Laguna described the ultimate goal of the household as survival. All members of a household are expected to contribute to the well-being of the unit (Black, 1988; Ehlers, 1990; Nash) through the performance of specific duties. The duties are defined by age, gender (Barrios, 1997; Ehlers, 1990), birth order and wealth (Nash) of the family. For example, household chores fall on the shoulders of the younger, ideally unmarried, women in the household unless the family can afford to hire someone, usually a poorer kin relation.

As defined by the acts of the Artesania Peréz and current board members, the goals and functions of the *artesania* are similar to those described for the household. The *artesania* was founded to provide a source of income for Juaneras so that they could provide for their children. In some cases tasks are divided amongst *artesania* members. These tasks include weaving, warping, natural dyeing and harvesting, sewing, embroidering and *jaspé* tying. The

[54] Due to the difficulties, including time constraints and limited recall of participants involved with reconstructing genealogical trees for all members of the *artesania*, I only documented the names of participants' husbands, parents, siblings, children and where possible spouses of these individuals.
[55] Of the members of the *artesania* with whom I spoke, only one was born outside of San Juan.

well-being of the *artesania* depends, partially, on the performance of tasks assigned to each member. One weaver said that "it takes too long for one woman to do everything to make one textile. But if one dyes, another warps and another weaves it goes faster and it is better for us all". Many *artesania* members agreed that by cooperating and pooling their labour they were better able to support themselves and their families. This co-operation extends to teaching new members how to warp and weave.

The *artesania* is also a source of emotional support for members. Women with problems often visited the houses of the president, vice-president and other members, such as the founders, to discuss personal problems. In a few cases, generally where the spouse was absent or abusive, the president was seen as a parental figure. "My mother," said one member "lives far away and my father is dead. My husband left me, I have three children and I am poor. I have too many problems and no family to share them with. The president is like my mother; I can go to her and tell her my problems and she will help me". Other members of the *artesania* referred to the president as their patron. In these cases, the patron-client relationship reflects the "vulnerability of people in poverty [and] reinforces their search for someone else's efficacy" (Vilas, 1997, p. 59).

The final aspect of a household comparable to the *artesania* is the nature of power. Nash (1970) notes that authority within the household is "male in men's work group and female in women's work group" (p. 114). Respect for age, i.e. older members of a group, also plays a role in household power relations (Black, 1988; Nash, 1970). Nash illustrates cases where socially designated power may be supported by wealth. "'Wealthy' families prefer to have their children live near them and will make an effort to build a house within their compound or nearby" (Nash, p. 104).

The president of the *artesania* controls all aspects textile production. The women come to her to get paid and receive work, she buys all of the necessary materials or commissions people to obtain them, liaises with external organizations including NGOs and credit groups and sells their products. Her power, as the president of the *artesania* is supported by social norms, a woman controlling women's work, and her control of the economic transactions within the *artesania*. The power of the president and placement of her kin in board positions of the *artesania* replicates the "internal political hierarchy [of the *chinamit*] centred on an aristocratic core family" (Hill and Monaghan, 1987, p. 41).

In their discussion on *chinamits*, Hill and Monaghan (1987) describe salt making in Sacapulas, Guatemala (see Figure 1). In the 1630s, the *Acalde Mayor* of Sacapulas, or mayor of the village, brought together six groups of people to produce salt (Hill and Monaghan). As the salt plains were located in Sacapulas, the mayor of the village retained control of the industry (Hill and Monaghan). The similarities between this *chinamit* and the *artesania* are striking. The activities of the *chinamit* and the *artesania*, salt and natural dyeing respectively, are based on a specialization. The organizational structure of these groups, the *artesania* president and *alcalde mayor*, are hierarchical. Control of the groups, seems to be based, partially, on the possession of key aspects of the specialization product, i.e. the knowledge of natural dyes and use processes, and salt flats. In order to make use of natural dye knowledge, the president of the *artesania* needed others to help with the production of textiles, just as salt production in Sacapulas was enabled by the inclusion of other groups.

My suggestion that the *artesania* is reminiscent of the *chinamit* is based on claim that larger social groupings in Guatemala simulate the household (Hill and Monaghan, 1987, Nash, 1970). The *artesania* is similar to a Guatemalan household in many ways, most notably the goals and functions. The difference in the composition of the two units is slight.

Although all of the women in the *artesania* are not kin (self-defined), there are noticeable groupings of kin, similar to the precolonial *chinamit* which functioned to provide support for groupings of families. One aspect of the household that has not been mentioned is gender relations and although the *artesania* is composed of an all-female membership, gender relations play a role in natural dyeing activities.

Gender Relations: Poverty as a Social Equalizer

The membership of the *artesania* is exclusively female. The president stated that the *artesania* will never allow males into the group as "they will take all of the power and instead of working for the group they will work solely for the advancement of themselves." However, men are employed to harvest natural dyes in the mountains and are considered, by the natural dyers, to be crucial to their work with natural dyes. Constructions of *machismo*, the term generally used to define Latin American male behaviour, will be discussed as it relates to the dyeing activities of the Artesania Peréz and Juanero households.

Bossen's (1984) work in Guatemala involved comparing an indigenous Mam peasant community with the Ladino urban class: "That economic factors play an important causal role in female-male relations proves particularly useful in accounting for the commonly observed ethnic differences in the treatment of women by men" (Bossen, p. 316). The poor treatment of Ladino women by males results from the fact that women are viewed as economic burdens "and less indispensable to men who earn most of the cash as individuals" (Bossen, p. 315). In the subsistence economy of the T'oj Nam indigenous community, a village in the northwestern Highlands of Guatemala, the labour, including agricultural production, clothing and food processing, of the whole family is necessary to the survival of the group. This accounts for the relatively higher social standing of women (Bossen, p. 317). The findings of

her research in four Guatemalan villages prompted Bossen to reconsider constructions of *machismo* as equally applicable to all classes of Guatemalan society and conclude that gender relations are influenced by economic and social circumstances.

Machismo is defined by Glittenberg (1994) as a psychological need to demonstrate masculinity and by Ehlers (1991) as the socio-politico-economic domination of women by men. Ehlers (1991) summarizes arguments of authors that discuss *marianismo,* as the complement to *machismo,* where "women welcome abusive behaviour (of men) as the spiritual verification of their true womanhood" (Ehlers, 1991, p. 4). Ehlers (1991) rejects the construction of a Madonna complex in favour of explaining women's behaviour as a "survival strategy emerging from female economic, social and sexual dependence in a society where men hold economic, political and legal power" (p. 2). Bossen (1984) and Ehlers (1991) both state that there are variations within gender relations.

The patriarchal relations governing social interaction in San Juan La Laguna were most noticeable when I interviewed members of the *artesania.* During one such interview, an *artesania* weaver waited for her husband to answer my questions and ignored my attempts to include her in the conversation. I returned later for a second attempt, ensuring that her husband was working in the fields. She discarded her former passive role and we engaged in a lively discussion. I attempted to interview the spouses of women in the *artesania* in an attempt to determine how the participation of their wives in the *artesania* affected their families. I had trouble getting men to agree to interviews, as they said they were too busy or were absent on the agreed upon day of the interview.

Approximately half way through my fieldwork I was able to explore the views of two men whose wives worked in the *artesania.* They were all related to the *artesania* president's immediate family, and included my interpreter's father and her brother. The latter is the

natural dye harvester that I accompanied on a number of occasions. Both men stated that the contributions of their wives were crucial to the survival of their families as they could not manage alone. One of these men, who is twenty-five years old, often took care of his children and cooked meals for his family. His participation in 'women's work' was not a source of shame or embarrassment but something that he viewed as necessary to the well-being of his family.

There were other examples that I witnessed that counter the *marianismo* model. One woman made her husband sleep on the floor. During one interview with a natural dyer, our discussion was interrupted by her husband who was intoxicated and wanted money. Although they were speaking in Tzutujil I understood the words for money, dogs and leave. A minute or two later the husband left the garden followed closely by their dogs. I often saw him sleeping in the streets as his wife revealed that she did not want him in her house.

The 'more egalitarian' gender relations that Bossen (1984) describes for T'oj Nam are similar to those that I encountered in San Juan La Laguna. This may be, as both Bossen and Ehlers (1991) claim, a result of the economic reality of Juaneros. In all of the interviews that I conducted with twenty-three members of the *artesania* there was not one case where the monetary contribution of the males was sufficient to support the household. Olson (1994) notes that women's monetary contribution to the familial economy in San Juan La Laguna is thirty percent, all of which goes towards necessary survival items such as shelter and food. I would argue that the contributions are higher based on the non-monetary contributions that women make to familial survival including: the production of clothing, animal husbandry, cleaning, child-care, cooking, going to market, and collection of fuel and water[56]. The

[56] See Waring's (1988) discussion on the issue of the marginalization of women's contributions by mainstream economics.

poverty of Juaneros results in a more egalitarian social atmosphere. The mere presence of the women's *artesania*, in which interdependency is necessary for maintaining the social unit, just as in the household or the *artesania*, supports this claim.

Social Capital: Natural Dye Knowledge

Social capital, commonly used to refer to relationships (Katz, 2000; Schmid and Robinson, 1995), "is manifest in collective knowledge (including environmental knowledge)" (Katz, p. 115). Based on Coleman's (1990) (see above) definition of social capital, knowledge is not only representative of this capital but capital in itself because knowledge is part of the social structure, a resource (see below) and is perceived by a number of members of the *artesania* as central[57] to their attempts to "improve individual and collective well-being" (Katz, p. 115). It is important to define the nature of collective knowledge in relation to natural dyes because, as has been illustrated (see above), not all members of the group have the same knowledge. The value of knowledge is apparent in the control of dyeing knowledge within the president's family and with respect to protection of the *artesania*'s market niche

Indigenous knowledge is acquired through socialization (Grenier, 1998) and is accessible "to those members of a social group charged with specific resource management and production responsibilities" (Fernández, 1994, p. 1). It follows then, that systems of indigenous knowledge are gendered (Grenier; Simpson, 1994). The genderization of knowledge may include channels of knowledge transmission[58] and differences in the

[57] The president summed up the feelings of a number of the members in the following statement. "We use natural dyes to differentiate our textiles from others around the lake. Without them they would be the same and maybe we would not sell as much. We must sell to feed our families." The use of natural dyes is linked with sales of the *artesania*'s products which in turn is linked to the survival of their families.
[58] This issue is discussed in Chapter Three.

composition of the knowledge (Fernández; Grenier; Simpson). In San Juan La Laguna, as considered by natural dyers and harvesters, specific ecological knowledge, including harvesting practices[59] and the location of dye plants and trees in the mountains, falls within the male domain of knowledge while dyeing processes are female knowledge.

The division of labour relative to natural dyes discussed above reflects the specialization of natural dyers within the *artesania*. Racancoj (1997) notes that a high degree of specialization was apparent in precolonial Mayan use of natural dyes. Further, that "*Quienes se dedicaron a la transformación de los vegetales en colorantes, desarrollaron una alta especialización en su prearación... solo ellos conocían*" [Whomever dedicates themselves to transforming vegetables into colourants, develops a high specialization in their preparation... that only they know] (Racancoj, p. 78). The president's specialization in the process of natural dyeing is a form of capital that can be, and has been in the case of her niece and daughter-in-law, transmitted to her descendants.

The president considers the knowledge of natural dyes passed on by her grandmother as a legacy. In her own words "it is all that she had to give me". The president has sold material family treasures, *huipils* and *cortes* that belonged to her ancestors "from long ago", but she is extremely reluctant to part with her treasured natural dye knowledge. The value of natural dye knowledge to the president is evident in her passing the knowledge to family members, women closely related either by blood or marriage (see Figure 11). She told me that she was going to teach her granddaughters how to use natural dyes, against the wishes of her son who wants them to be educated, as it was important. It is part of her legacy to her granddaughters as well as a tribute to her grandmother "by keeping this knowledge alive".

[59] I did not collect sufficient information to make a comparison between male and female harvesting practices. During the one time I observed a natural dyer remove bark from a *nance* tree she was scolded by her brother for harming the tree (she took bark from an area where much bark had been taken and dug into the tree rather than simply removing the outer bark).

Limiting the access to natural dye knowledge provides her family with a specialization, an extra tool for survival.

Natural dye knowledge and practice is also perceived as an asset of the *artesania* by the majority of the members. Controls designed to protect the knowledge from becoming commonplace in the community are presented above. The secrecy surrounding natural dyes extends to materials purchased by *artesania* members in local markets. The president asked one of her daughters to purchase *achiote* in the market of San Juan and was instructed by her mother to mention that the family wanted to make soup. The president said that she does not tell merchants that she uses it for dyes as she believes that the prices will be inflated. This may reflect the 'preciousness' of dyes or the perceived value of natural dyes on the market. Her concern also reflects the fact that the transmission of indigenous knowledge can occur through unstructured channels such as conversations at markets (Mundy and Compton, 1993).

Competition for Natural Dyes

The increasing scarcity of trees and plants near the village has resulted in more intensive use and increasing competition for dye resources. This competition includes other dyers, and other economic/household uses for natural dyestuffs. Competition from other natural dye producers is currently not a problem for the Artesania Peréz, although it may become critical as another weaving project in San Juan is taking up the use of natural dyes[60] (see Chapter Nine for further discussion). Alternate uses for dyestuffs fall into three groups including those that use the same part as is used for natural dyes, different parts or the whole plant or tree.

[60] I talked with the president of this group but she would not divulge the dyes that they were interested in learning to use.

Alternate uses of natural dyes include medicines, ceremonial roles, foodstuffs, fertilizer and construction (see Table 2). The requirements of the alternate uses generally coincide with the parts used for natural dyes. In the case of the *nance* tree (see Chapter Six) the amount that we collected was lessened by activities of others taking bark from the tree prior to our arrival. We encountered the same problem in San Pedro La Laguna when we went to purchase indigo leaves. The owner sold us a few leaves as he stated a woman had been previously to purchase it for medicinal purposes.

Coconut is an example of something that can be used for dyes and for alternate purposes. Compatibility may be seasonal as in the case of *injerto.* An *injerto* owner refused to sell the bark when the fruit was ripe because it made it difficult to climb the tree to pick the fruit. Procuring coffee pulp for natural dye production also depends on the season. The dyers said that during February and March, when coffee is usually picked, coffee pulp is abundant and relatively easy to obtain for dyes. From April to January, it is difficult for the *artesania* to obtain coffee pulp because it is being used as fertilizer by the owners.

The use of trees for heating and construction is in direct competition with the harvesting of dyestuffs from trees. Cedar trees, for example, are felled for use as lumber in the construction of houses. Natural dyers stated that they are unable to obtain the heartwood from this tree as it is scarce and the remaining sources are for the sole purpose of construction. Cutting live trees for firewood, responsible for twenty-five percent of deforestation (Barry, 1992), also decreases the dye resources available to the *artesania.*

The hierarchy of uses for a specific material is dependent on considerations such as the person, their circumstances and requirements. The use of coffee pulp for fertilizer may be more important to an owner than selling it to the *artesania.* The absence of a meaningful

Table 2 Seasonal Availability and Alternate Uses of Dyestuffs

Spanish Name	Season of Availability	Alternate Uses Observed in San Juan La Laguna	Parts Used for Alternate Purposes (see Table 1)
Achiote	all year	foodstuff	seed pods
Aguacate	all year	medicine	leaves
Aguacalipto	all year		
Camotillo		foodstuff	whole vegetable
Cedro	all year	construction	heartwood
Chilca	end of rainy season (May to September)		
Coco	March, April & May	foodstuff	white centre (note: dyers use brown outer husk)
Cola de Leon	September & October		
Encino			
Flor de Muerto	October & November	ceremonial	whole flower
Grenada	September & October	foodstuff	fruit
Injerto	all year but restricted in July and August	foodstuff	fruit **
Ilamo			
Nance		medicinal	bark
Pulpa de café	February & March	foodstuff	outer husk of coffee bean
Remolacha		foodstuff	whole vegetable
Rosa Jamaica	September, October & November	medicinal	flower petals
Sacatinta (Tree)	*		
Sacatinta (Plant)	*	medicinal	leaves
Sacatinta	*		
Zapote		foodstuff	fruit

*Note: Indigo may be collected at any time throughout the year but is not considered to be ripe by the dyers until the beginning of February when the true indigo colour can be achieved.
**Note: The *artesania* dyers know how to use fruits from this tree but prefer to use only the bark for dyeing.

relationship, or household/familial obligation, results in the failure of the *artesania* to acquire a dyestuff, as in the case of cedar. However, in many cases, such as *ilamo*, pomegranate and *flor de muertos*, social networks are valuable for procurement.

Social Capital: Influence on Physical Environment

In Chapter Five it was noted that social capital plays a role in resource sustainability (Atran et al., 1999; Katz, 2000). Acknowledging social factors relevant to natural resource sustainability is important because these factors are implicated in the definition of sustainability[61] adopted for the research. This definition focuses on the human element, present and future generations and their needs, whereas other definitions of natural resource sustainability (see Chapter Six) make no mention of resource users. Aspects of the social organization of the Artesania Peréz that influence the natural environment include the protection of the *artesania*'s market niche, social conventions governing resource use and the role of individuals in resource management.

Protecting the market niche of the *artesania* is an economic motivation, although controlled through social networks, which influences the physical environment and intensity of use of local dye resources. The dye collector, whom I accompanied into the mountains, said "if everyone used natural dyes then the trees would not be able to take it and they would die". The refusal of the *artesania* dyers to share their dye knowledge[62] restricts the pressure on the dye trees and plants (see below).

Katz (2000) states that "while the detailed nature of the rules governing Highland communal forest suggest a highly evolved CPR (Common Property Regime), it is important

[61] Meeting "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8).

[62] The refusal to share artesanial skills seems to be restricted to dyes as women with weaving, embroidery or sewing skills stated that they would be more than happy to share these with others and teach them.

to note that these rules and their enforcement are normally quite informal, and sanctions almost exclusively moral in character. This means that communities rely on socialized knowledge of, and respect for, a fairly restrictive set of use rights in order to preserve the resource" (p. 126). According to natural dyers and harvesters, the use rights and rules of the commons are not formally codified as "everyone knows them". I asked the dye harvester and two natural dyers, who had engaged in dye collection in the past, what use rights and restrictions applied to harvesting natural dyes. They replied that they could take whatever they wanted from the jungle (communal lands) but not more than a specific tree could withstand and live. This informal restriction on overharvesting is similar to the restrictions that Katz notes for the use of plants for medicinal and nutritional purposes.

The social conventions governing the harvesting of dyestuffs were evident, to a degree, during two of the dye collection trips that I participated in. In one case I overharvested *flor de muerto* from one area and was told to put some back. During the trip to collect *nance*, a natural dyer was taking bark from the tree and stopped after her brother spoke to her[63]. In these cases, social sanctions governing harvesting, that I as an outsider and she as a woman had no knowledge of, were enforced through discussion and explanation. It is important to note that dye harvesting or collecting is done by a group of at least two people, ostensibly for safety. However, this means that dye harvesting is self-monitored by social circumstances implied by working in a group. One person may choose to ignore social sanctions whereas two increases the likelihood of practising sustainable use of natural dyestuff resources.

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[63] Their exchange was in Tzutujil so I did not understand what either said. However, immediately after this he said that the bark on the trunk of the tree, where the dyer had been removing bark, would not withstand removal of more bark.

According to natural dyers and harvesters, the penalties for overharvesting are not individually acquired, such as fines or imprisonment. The harvester summarized the feelings of all those involved in dyeing activities in the following statement: "If we do not use the trees properly then they will die and eventually we will have none, our children will have none and our grandchildren will suffer". This statement also illustrates the perceived moral obligation of resource users to future generations reflected in the definition of sustainability (see above) chosen for the research. This obligation also extends to tree owners as unsustainable use would lead to the death of the trees leaving the owner without future income.

The choice of individuals employed to harvest natural dyes by the *artesania* partially determines the impact that the group has on the local physical environment with reference to natural dyeing activities. Medley (1993) notes on her work in Kenya with the Tana, that "those involved in extraction may come to act as local stewards" (p. 182). It is evident from the description of natural dyeing activities in Chapter Five that the dye harvesters and collectors employed by the Artesania Peréz are acting as resource managers. The harvester defines himself as concerned with the state of the environment and "harvests only in ways that do not damage the dye plants and trees". He said that he is "obligated to share his knowledge with others to ensure that the dye plants and trees continue to be used in a non-damaging way".

Discussion

The Artesania Peréz makes use of a variety of relationships to gain access to natural dyes. These networks reflect general access pathways of procurement as illustrated through comparisons of the *artesania* and indigenous Guatemalan households. The most prominent

aspect is the interdependency of *artesania* members with those that engage in natural dyeing activities. All members within the household, in this case those specifically associated with natural dyeing activities, are perceived as necessary to the survival and well-being of the unit.

Access to resources is a critical issue for natural dyers in the Artesania Peréz. The definition of resources should be expanded beyond the 'natural' described by Stevenson (1996) and Vivian (1995) to include relationships (Alcorn, 1981) and knowledge. The absence of either relationships, dye materials or knowledge would result in the abandonment of natural dyeing. Social networks of relations are extremely important to the *artesania* with reference to the issue of access to natural dyes because the Artesania Peréz does not own land on which to grow natural dyes. The non-kin relationships include merchants and individual resource owners. Achiote, beets, the indigo tree and bush, *injerto* and *zapote* are the dyes that the *artesania* was able to access through these relationships. The most important aspect of these relationships is that they provide inter-regional access to dyes. The *artesania* relies on individuals, through the formal or informal market, to obtain coconut, *nance* and *rosa jamaica* from the Pacific Coast, Nawala and Sololá respectively[64].

As members of the extended family of the president, the harvesters are critical to providing access to bark dyes and other dyestuffs collected in the mountains. In the case of pomegranate and *flor de muertos*, access was provided through extended kinship of various *artesania* members. I accompanied a natural dyer to obtain these materials and the general unavailability of these dyestuffs[65] made it necessary for us to obtain *flor de muertos* and pomegranate through kin relations of *artesania* members.

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[64] It is also possible that unrelated individuals, i.e. NGOs or other natural dyers introduced the *artesania* dyers to new dyestuffs. However, each dyer whom I asked replied that they learned dyes through the president or experimentation.

[65] Pomegranates were not as abundant as previous years because of the long rainy season. The ceremonial use of *flor de muertos* made people reluctant to part with them as they wanted to retain their resources for personal use.

Kin relations also provide access to natural dyeing knowledge. As illustrated in Figure 11, all of the natural dyers and dye collectors are related to the president of the *artesania*. She stated that she learned to dye from her grandmother. I gained access to natural dye knowledge through my position as an adopted daughter within the household of the *artesania*'s president. The degree of kinship in the case of natural dye knowledge is much narrower than those relationships used to provide access to natural dyes. Reasons for this may be due to a differential in obligations associated with degrees of kin (see Nash, 1970).

The *artesania*'s lack of natural (land) and economic (credit or monetary) capital has resulted in a reliance on social capital for the continuance of natural dyeing activities. Social capital of the Artesania Peréz includes relationships and natural dye knowledge as critical elements of their strategy for survival. The use of the word capital attests to the value of the relationships and knowledge, although I discuss their worth in a general sense rather than specific monetary amounts. Social capital is valuable to natural dyers and harvesters, the *artesania* as a whole and, as suggested in Chapter Six, the physical environment.

Chapter Eight Reflections

The previous chapters provide descriptions of the practical methods used to carry out the research (Chapter Four), and specific research findings, including: the dyes used by the Artesania Peréz (Chapter Five), interaction with the physical environment (Chapter Six) and social aspects of natural dye production and use (Chapter Seven). This chapter is intended to provide a broader consideration of, and reflections upon, the research endeavour. I will briefly consider the wider relevance of the research. Then I will present my reflections on the human ecological approach, described in Chapter Two, which provided the theoretical framework for my investigations.

Relevance of Research

The research agenda was motivated by a variety of considerations that intersected in a small village in the Central Highlands of Guatemala. A scarcity of Guatemalan natural dye literature (see Chapter Five) and the contributions of the research to the published literature are noted above. The encouragement of small-scale weavers to return to natural dyes by NGOs (see Reiche, 1999) concerned me in light of the scarcity of research on natural dye production and use. The research findings are relevant to the Healthy Dyes Project (see Chapter One) as my investigations were undertaken as a part of this larger research agenda. Finally, I was moved by the two *artesania* members whom I met in November, 1999 and their desire to share their stories.

Development programmes, that encourage groups to adopt or return to natural dyes, must be approached cautiously. The published literature contains many examples of unsustainable development. Shiva (1989) presents the case of a social forestry product in

India in which "the experts decided that indigenous knowledge was worthless and 'unscientific', and proceeded to destroy the diversity of indigenous species by replacing them with row after row of eucalyptus seedlings" (p. 79). Although eucalyptus increased cash and commodity flows, the costs involved the destruction of "the water and land and organic matter base for food production, (and) women's productivity in sustenance" (Shiva, p. 80).

The present research is useful for NGOs encouraging a return to natural dyes as a guide to issues that need to be taken into consideration in the policy or planning stages of development. Based on my observations, the following questions are examples of what should be asked of the intended community: What materials are available and where? What are the alternate uses of these materials? What is the carrying capacity of natural dye sources? Can these materials be accessed within existing social networks? By whom and to whom is knowledge transmitted? Is there gender differentiation of tasks? The example of unsustainable development presented above illustrates the need to ask basic questions before any action is considered.

As an ethnography of natural dyeing in San Juan La Laguna, the relevance of the present research for NGOs is heightened by the fact that it represents development from within (Burkey, 1993). The impetus for the readoption of natural dyes by the Artesania Peréz came from within the community rather than from an outside organization. As members of the community, natural dyers and harvesters are aware of potential constraints on their activities. They are aware of social sanctions governing harvesting, the availability and accessibility of natural dyestuffs. As the harvesters and producers of the dyestuffs, they see the changes occurring and can alter their behaviour accordingly. An example of this is the scarcity of cedar in the area of San Juan La Laguna. The *artesania* attempted to procure cedar through social networks and when the dyers were unable to procure it they decided to

experiment with other materials to produce an identical colour. The research may be used as a basis to formulate questions to pose to the intended group to explore location/group specific weaknesses and strengths.

The research underscores the importance of including those people who are at the core of an activity or intervention (Shiva, 1989). Knowledge that is shared by one group, whether it is based on gender, age or nationality, is not necessarily part of another group's knowledge. An example of this is the response that I received when I asked a natural dyer why it was so difficult to procure coffee pulp outside of February and March. She laughed and her nine-year old daughter replied, "everyone knows that. It is because coffee is picked and processed in those two months". My lack of coffee knowledge was a source of amusement for the women that day and as a student doing research I could laugh with them. However, overlooking something so fundamental in the planning or action stages of a development program could be disastrous[66]. This document, as a record of the *artesania*'s accomplishments and efforts relative to natural dyeing, illustrates the need to support policy that calls for the inclusion of the indigenous group that is the recipient of the intervention.

The research presented in this document has the distinction of being the first fieldwork completed within the larger Healthy Dyes Project (See Chapter One). My investigations support the need for research of dyes used by small-scale textile producers within a holistic framework as envisioned by the HDP (1999). Although my research agenda was confined to the physical and social environments, relating to natural dyes and dyeing in San Juan La Laguna, health, cultural and spiritual significance of dye trees and plants (see Chapter Five) and economic circumstances were revealed as issues requiring further study.

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[66] Not only for the fact that coffee pulp dyeing is generally restricted to these months but that many of the artesania members cut coffee in these months rather than, or in addition to, engaging in textile production.

The theoretical framework used for my research should be re-evaluated by the HDP, including myself as a member, and, in the words of Vivian (1995) discussing the role of indigenous knowledge for sustainability, can be "developed (and) refined" (p. 58) in order to further the goals of the HDP (see Chapter One). Finally, the data presented in this thesis contributes to its goal of "record[ing] indigenous knowledge of natural dyes" (HDP, p. 2).

The relevance of the research for the Artesania Peréz is not as high as I had originally hoped. Primarily, my fieldwork in San Juan La Laguna was an acknowledgement of the women's efforts. In the words of one weaver "Nobody else is interested in my work or what my life is like. I suffer everyday and no one notices but you came here from far away to talk to me and that makes me feel happy. I feel like my work matters[67]." My presence in San Juan and the research that I was doing was a source of increased social status for members of the *artesania*.

The way in which I approached the research, both theoretically and practically, provided a forum for the women to discuss what they perceived should be included in future research. The major concern, voiced by a majority of the women in the *artesania*, was for a desired expansion of their market base. In short the women wanted to know where and how to sell more of their products. This research presents information on the *artesania* and the materials they use to make their textiles, that could be used as a starting point for researchers investigating potential markets for the *artesania*'s textiles.

The research is relevant at a number of different levels. It provides an example of factors that are necessary to consider prior to the intervention of an NGO or other development organization. The research also emphasizes the need for development policy

[67] These words were echoed by many of the women that I had discussions with in San Juan La Laguna. These sentiments carried me through the times when I questioned the objectives and value of my research. However, the women may have been motivated, at least partially, by what they perceived that I would be able to do for themselves or the *artesania*.

that includes indigenous knowledge holders (see Ulluwishewa, 1993) and considers the specific location of the intervention recipients. Further, the research also supports the need for research programs such as the Healthy Dyes Project. The relevance of this research for the Artesania Peréz is indirect. Hopefully, this research will generate wider interest in the activities of the *artesania*. This research could be integrated with future research as the economic environment is interconnected with the social and physical. Hence, this research contributes to a more holistically complete understanding of natural dye use by the Artesania Peréz.

Revisiting Theory

The use of a human ecological approach proved essential to this research for reasons involving both practical and theoretical considerations. The key tenets of this approach, described in Chapter Three, are: interdisciplinarity, interconnectedness, complexity & applicability of findings. Overall the guiding principles of a human ecological approach proved beneficial but not without shortcomings. I will briefly discuss both the positive and negative aspects of the theoretical approach that guided this research.

The holistic nature of the approach enabled an organic consideration of indigenous knowledge, in the sense of vitality and wholeness. Indigenous knowledge is introduced in Chapter Two, as it was originally conceived at the beginning of the fieldwork period in Guatemala, but as evident in further chapters the definition was incomplete. Through my investigations I expanded the definition of indigenous knowledge in order to acknowledge its gendered nature and the different transmission pathways. I believe, based on the accomplishments of this research, that the definition is incomplete, as cultural and spiritual aspects of this knowledge have not been fully explored. For example, Stevenson (1996)

combines social, cultural and spiritual knowledge as 'other traditional knowledge' but states, in relation to environmental knowledge, that "it is important to understand the different contexts that give such knowledge meaning and value" (p. 282). Therefore, conceptualizations of indigenous knowledge must be expanded to reflect the importance and contributions of this 'other' knowledge to the whole.

The complexity of the return to natural dyes by the Artesania Peréz necessitated an interdisciplinarity approach, viz. a human ecological approach. It enabled the consideration of the social and physical environments within the whole of natural dye knowledge and the interconnectedness of the parts to the whole. For example, although the economics of natural dye use was beyond the scope of this research, the nature of the approach enabled me to see the links and allude to them if not to describe them in depth.

The interdisciplinary nature of the human ecological approach is a challenge. It demands familiarity with 'disciplinary knowledge' on a wide range of topics. This requires the ability to translate disciplinary jargon into meaningful terms for this research, for example natural dyes, social capital, non-wood forest products, *cola de leon* and Cuscuta american L. The lack of disciplinary boundaries also made it necessary for me to clearly define research goals and adhere to them in order to achieve any depth in the consideration of natural dye production and use by the *artesania*.

In spite of the difficulty that I encountered with the holism of a human ecological approach, the principles of interdisciplinarity, integration and interconnectedness resulted in a richer investigation. In reference to the practical side of the research, my use of different methods enabled me to obtain information in a variety of ways depending upon which was the most appropriate for the circumstances.

The inclusion of the Leiden Ethnosystems approach (Slikkerveer and Dechering, 1995) as part of the theoretical background was critical to the determination of the sustainability of natural dye harvesting practices. The discussion in Chapter Three illustrates the marginalization of indigenous knowledge. Formalized education is not the only way to learn sustainable use practices. In fact, the harvester said that 'experts', within the limited definition of academic degree holders, consulted him for a variety of projects involving investigations into deforestation and the cultivation of coffee. His eclectic education provided him with specific knowledge of plants and trees, the local ecosystem and human impacts on the physical environment or, in other words, expert knowledge.

Perhaps, the most important aspect of this approach is what it offers for the future of natural dye research through the principles of inclusion, integration, interconnectedness and applicability. Inclusion provides for interdisciplinary work (Jungen, 1986) as well as including indigenous people as experts (Ulluwishewa, 1993) and indigenous knowledge as valuable, both for the sustainability of the natural environment and the goals of the people. Breaking the disciplinary and 'expert' boundaries recognizes and includes complexity (Jungen) even if it cannot be easily reconciled. This inclusion results in greater understanding or richer data. The principle of interconnectedness encourages the acknowledgement of interdependency whether it concerns interhuman relationships or the relationship between an individual or group and their natural environment.

Chapter Nine: Conclusions and Recommendations for Future Research

Conclusions

It is interesting that a landless weaving group has returned to using natural dyes. The *artesania* is unable to cultivate their own dyestuffs as they do not own land on which to plant dye trees. Land ownership is a critical issue in Guatemala (see Chapter Six). As land accumulates in the hands of the elite, indigenous Mayans are forced to intensify cultivation of their lands, bring marginal lands into production or pursue other strategies for survival. Four Juaneras founded the *artesania* as a survival strategy in the absence of lands with which to support their families.

As the area of cultivation spreads outwards from the villages around Lake Atitlán, potential sources for natural dyes are lost. The poverty that forces Juaneros to deplete natural resources is, paradoxically, the same poverty that encourages the *artesania* to use natural dyes. The Artesania Peréz is in a precarious position with reference to natural dyes. The needs of natural dyestuffs sufficient for textile production must be balanced with the desire to protect these trees and plants so that they may be used by future generations of Juaneros.

The *artesania* has shown versatility in reacting to the increasing pressures, from competition for scarce resources, the circumstances of the civil war and the disappearance of the resources themselves, on natural dye use. As the distance to dyestuffs increased, men were employed to harvest natural dyes. In San Juan La Laguna, women are restricted, by considerations of safety and gendered constructions of space, to the village. Comparatively, men are free to explore areas farther distances from the village in order to locate and procure natural dyes.

Experimentation with potential sources of natural dyes demonstrates the flexibility required to perpetuate natural dyeing processes. I offer the examples of *purpura* and *cedro* as

illustrations. In the course of compiling the natural dye inventory, I asked dyers about the use of *purpura*. The women stated that they were unfamiliar with it and I explained what it is and how dye is extracted. They were curious as to how shellfish could produce dye going so far as to test the extraction method on a bucket of snails collected from the lake. After failing to produce dye from the snails, the dyer noted that they would be used as originally intended (dinner) and that it was no loss as they were able to produce purples using pomegranate and *rosa jamaica*. Dyers were able to reproduce the colour of *cedro* dye with other dyestuffs when the use of the tree became restricted to construction.

Thus far, the *artesania* dyers and dye collectors have been able to encourage the protection of natural dye trees and plants, and ensure that natural dye knowledge will be passed on to another generation. However, the tenuous balance between the needs of the inhabitants around Lake Atitlán and the capacity of the trees and plants to support these requirements, that characterizes the natural dyeing activities of the *artesania*, may not endure. As social and natural capital both contribute to sustainability (Katz, 2000), and the *artesania* has natural dye knowledge and social organization to undertake natural dyeing sustainably, it seems to be lacking only the land. If the *artesania* had its own land, or access to lands that are controlled, then the dyers and harvesters would be able to ensure that their great-grandchildren could become familiar with the diversity of plants and trees and natural dyeing processes.

Recommendations for Future Research

The day that I left San Juan La Laguna I wrote the following in my journal:

> "Now that the day has arrived I want the impossible- to go home and to stay to continue with my research. After five months of learning and asking questions I still have much to learn and more questions than when I arrived in September.

> However, it is just as likely that I could still be saying 'just five more months' after two years of research in San Juan. I console myself with the fact that 'research' is an ongoing process, as others have preceded me others will follow. Perhaps, I will be able to return some day (January 21, 2000)."

At the time of writing, six months later, I am at a similar point of wanting to extend my research activities while looking to the future. Up to this point in the document, I have represented my 'research', now an event in the immediate past. It seems appropriate to finish this document with my recommendations for future research based on the accomplishments of this research.

Chapters Six and Seven included discussions on the sustainability of the natural dye harvesting practices of the Artesania Peréz. The investigations into sustainability were based on two important considerations. First, that the Artesania Peréz is the only group using natural dyes in San Juan La Laguna. Second, that dyestuffs were extracted at a certain rate to meet the *artesania*'s current needs, at that time. The question I would like to encourage future researchers to pursue is how the sustainability of harvesting practices is affected by the expansion of natural dye extraction.

I have recently heard that a second weaving group in San Juan La Laguna is incorporating natural dyes into their textile production. Will the introduction of a second natural dye group result in overexploitation of the natural dye plants and trees surrounding San Juan? Important considerations include the dyes that they intend to use compared to the *artesania*'s dye palette, and how they procure the dyestuffs. Further, a comparison between

the Artesania Peréz and the second group on these points would be interesting as the other group was taught to use dyes by a person from outside the community[68].

The social organization of the *artesania* and the choice of natural dye harvesters represent the group's control over the impacts that their harvesting practices have on the natural dye resources. The incentives of the harvesters (see Chapters Six and Seven) encourage them to practice sustainable use of natural dyestuffs to ensure the survival of the trees, themselves and their children. How will the addition of a new user group affect the incentives of harvesters and the *artesania* to practice harvesting sustainability? In Indonesia the expansion of the market for rattan has affected both the system of rattan procurement and the sustainability of rattan harvesting (Arnold, 1995). Prior to this expansion the trading relationships "involved networks of local collectors and intermediaries" (Arnold, p. 108). The local collectors were replaced by short-term traders entering the markets "raising prices to producers and stimulating increased harvesting" (Arnold, p. 110).

The expansion of the natural dye user base in San Juan La Laguna has the potential to become a 'tragedy of the commons' (Hardin, 1968). In this scenario each individual increases consumption to maximize personal benefit and as the costs are not sustained individually but wholly, the ultimate result is overexploitation of the commons (Hardin, 1968). "Conflicts in resource use have to be considered because they can be the major causes of resource destruction" (Reis, 1995, p. 271). It remains to be seen whether intravillage competition for natural dyestuffs is a threat not only to the local dye plants and trees but to natural dyeing as a whole by the Artesania Peréz. In the words of the *artesania* president, "without these plants and trees we cannot make the dyes".

[68] The *artesania* dyers declined to teach them to use natural dyes and I was told that the group learned to use natural dyes from an NGO. It is possible that the groups involved with the publication of Reiche's (1999) manual are involved with this weaving project.

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